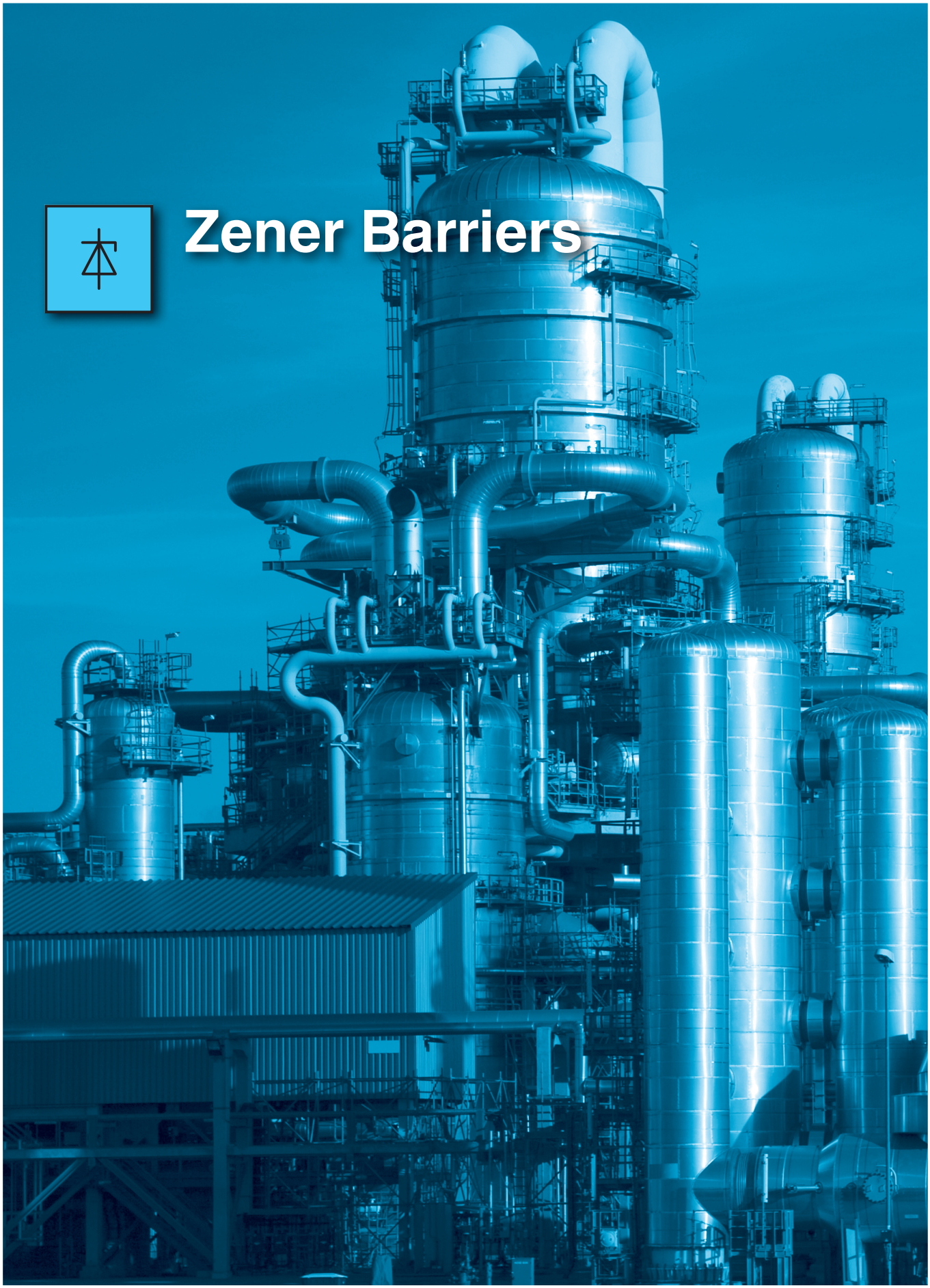


Zener Barriers

Edition 908837 (US) / 208599 (EU) 11/2010

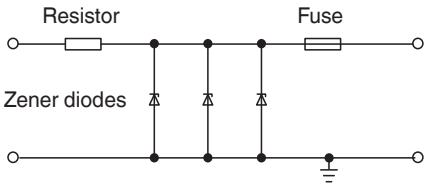
Pepperl+Fuchs Group
www.pepperl-fuchs.com
USA: +1 330 486 0002
pa-info@us.pepperl-fuchs.com
Germany: +49 621 776 2222
pa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091
pa-info@sg.pepperl-fuchs.com

PEPPERL+FUCHS
PROTECTING YOUR PROCESS

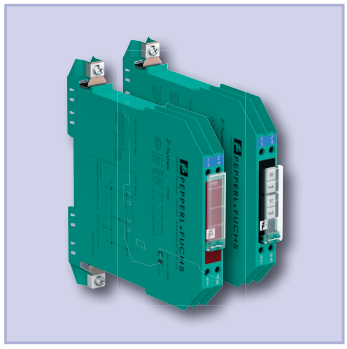
Zener Barriers have long been a cost-effective solution for providing an intrinsically safe interface with field devices located in the hazardous area. Pepperl+Fuchs offers two distinct Zener Barrier products. The Z-System barriers are 12.5 mm wide and mount and ground directly to standard 35 mm DIN rail, while the SB-System barriers are the only termination board-based solution with plug-in modules.

Operating principle

Zener Barriers provide a cost-effective solution because of their simple design, which consists of zener diodes, a current limiting resistor, a fuse, and the intrinsic safety ground. Each plays an important part interfacing with equipment in the hazardous area. The zener diode clamps when there is an overvoltage on the safe area side, diverting excessive current to the intrinsic safety ground, and the fuse opens to prevent the transfer of unacceptably high energy into the hazardous area. The current limiting resistor limits the current in the event of a short circuit in the hazardous area, while the dedicated intrinsic safety ground provides the necessary low resistance path for zener diode fault current.



Z-System 412



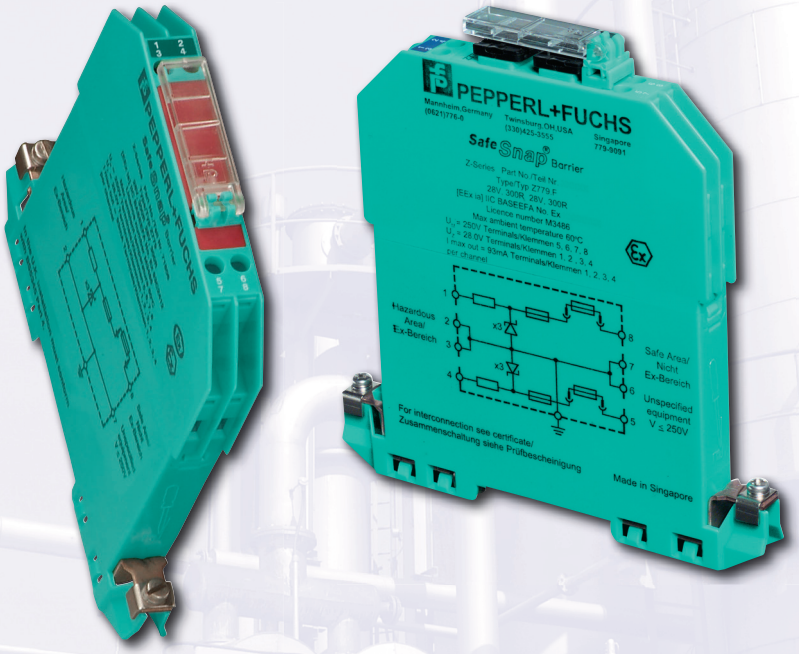
- Quick and easy installation on DIN mounting rail
- Full range for AC and DC applications, 75 modules
- 1-, 2- and 3-channel versions
- Snap-on DIN rail ground/earth connection
- Replaceable fuse facilitates circuit loop checks and reduces installation cost and space
- World-wide approvals

SB-System 452

- Plug-in Zener Barriers, 1- and 2-channel
- Replaceable pre-fuse
- Termination Boards for 1, 6, or 10 barrier modules
- Common potential equalization with multiple barrier boards
- Comprehensive module portfolio
- World-wide approvals

Edition 908837 (US) / 208599 (EU) 11/2010

Z-System



Edition 908837 (US) / 208599 (EU) 11/2010

Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0002 pa-info@us.pepperl-fuchs.com
Germany: +49 621 776 2222 pa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 pa-info@sg.pepperl-fuchs.com

Edition 908837 (US) / 208599 (EU) 11/2010

Introduction

The Z-System Zener Barriers have a full range of products for AC and DC intrinsic safety applications with over 75 different models. Single-, dual- and 3-channel versions are available for quick and easy installation. These Zener Barriers conveniently mount on standard 35 mm DIN rail. The process of mounting each barrier on the DIN rail makes an electrical connection to the internal earth/ground network necessary to maintain the intrinsic safety rating of the barrier. Replaceable fuse versions are also available to help facilitate circuit loop checks and reduce installation cost and space.

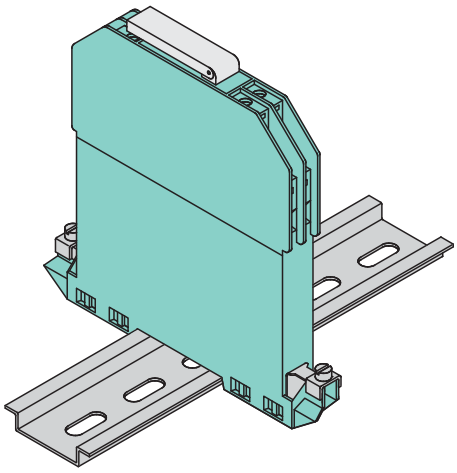


Figure 1 Zener Barrier Z-System

Housing

Z-System is a modular product range that features a space saving 12.5 mm wide housing and can incorporate up to 3 channels. The Z-System barriers are epoxy filled, and constructed to a protection classification of IP20, and are equipped with cage clamp terminals, that accept wire up to 2.5 mm^2 (14 AWG).

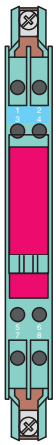


Figure 2 12.5 mm housing

Mounting

The Z-System barriers snap on standard 35 mm DIN rail and are ideal for racks or control cabinets. They can also be located in Class I Division 2 and Zone 2 hazardous areas when installed in enclosures with the appropriate protection category.

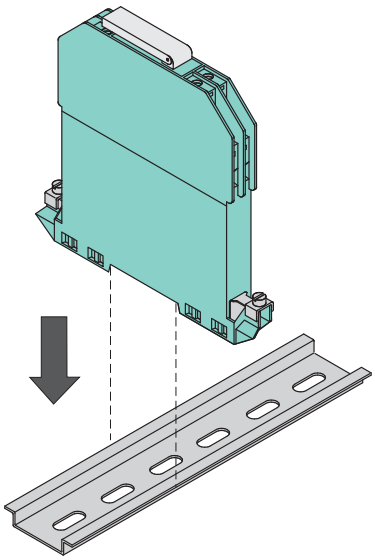


Figure 3 Mounting Zener Barrier Z-System

Operating principle

The Zener diodes within the barriers are connected in the reversed biased direction. In normal operation the barrier will remain virtually transparent to the control loop.

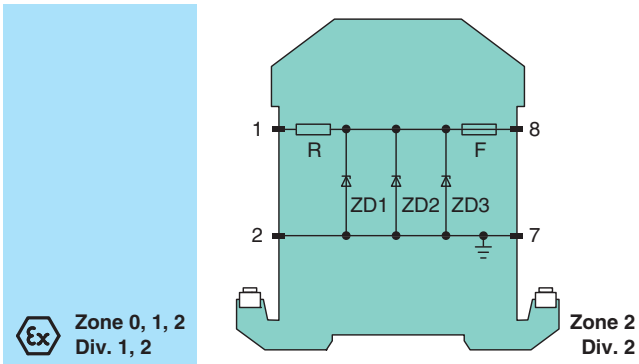


Figure 4 Circuit diagram (example)

If the diode breakdown voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to open, thus preventing the transfer of unacceptably high energy into the hazardous area.

Edition 908837 (US) / 208599 (EU) 11/2010

Terminals 7 and 8 are typically connected to a control circuit in the safe area. The single condition that the control circuitry must satisfy, is that it must not contain a source whose potential relative to earth is greater than 250 V AC or 250 V DC.

Terminals 1 and 2 are connected to the intrinsically safe circuits (field device) in the hazardous area. These types of devices are referred to as the intrinsically safe apparatus and must be certificated unless the electrical values do not exceed any of the following values: 1.5 V, 0.1 A, 25 mW. Pepperl+Fuchs Zener Barriers are identified in terms of voltage, resistance and polarity, e. g., 10 V, 50 Ω, positive polarity.

These figures correspond to the zener voltage U_z and the total resistance of all barrier components. They therefore represent the safety values. The values stated on the type identification label correspond to the "worst case" data for U_z (U_o, V_{oc}) and I_k (I_o, I_{sc}) determined during certification; I_k is obtained by dividing U_z by the resistance R. It should be noted once again, however, that these values do not correspond to the operating range of the Zener Barrier.

Ideally, Zener diodes would not allow any current in the reverse direction until the zener voltage has been attained.

In practice, Zener diodes do allow a small leakage current, the value of which increases as the applied voltage is increased.

The operating range of a Zener Barrier must therefore be such that it is below the zener voltage, so that the leakage current is restricted to a minimum. Zener Barriers are normally tested to ensure that at the prescribed voltage the leakage current is smaller than 10 µA.

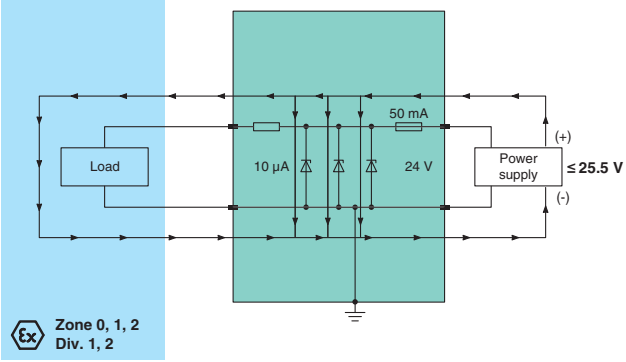


Figure 5 Leakage current through the Zener diodes

Figure 5 shows the flow of leakage current through the Zener diodes under normal circumstances. The Zener Barrier conducts a maximum of 10 µA (1 µA) leakage current so long as the supply voltage is less than 25.5 V. This is normal and has very little effect on the load. If the voltage exceeds 25.5 V, the Zener diodes start to conduct more current. This can have an effect on the operating current and the accuracy. It is recommended that a regulated voltage source be used, which maintains the voltage under the value at which the diodes will start to conduct. (A 24 V, 300 Ω barrier is represented here as an example.)

These voltages are stated in the data sheet for a given barrier, together with the leakage current. If the leakage current for a given voltage differs from 10 µA, this is specifically stated.

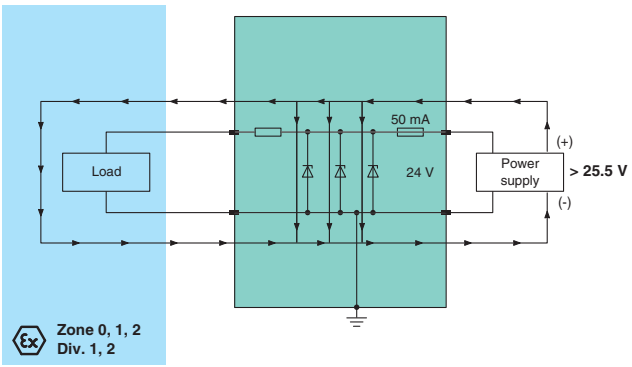


Figure 6 Total current drains through the Zener diodes

Figure 6 shows that if the maximum permissible input (supply) voltage is exceeded, the total current drains through the Zener diodes, without reaching the hazardous area.

Pepperl+Fuchs Zener Barriers have a low series resistance, given by the sum of the resistance R and the resistance value of the fuse F (see Figure 4). Due to the low series resistance, an inadvertent short-circuiting of terminals 1 and 2 can cause the fuse to open.

If the Zener Barriers are provided with a resistance, this limits the short-circuit current to a safe value in the event of a short circuit of the connecting wiring in the hazardous area or a connection to earth of the wiring attached to terminal 1.

Some barriers are available with a resistance connected between the output terminals. These are used in 4 mA to 20 mA transmitter circuits. The resistance converts the current in the intrinsically safe circuit into a voltage that can be measured in the safe area.

Pepperl+Fuchs Zener Barriers can be used in many applications. In the simplest case, a single channel barrier with a ground connection is used. But in many applications it is not desirable that the intrinsically safe circuit is connected directly to ground. If the circuit in the safe area is grounded, under some circumstances grounding of the intrinsically safe circuit can lead to faults within the system. In this case, quasi-ground-free intrinsically safe circuits can be constructed with two or more Zener Barrier channels. Pepperl+Fuchs offers 2- and 3-channel barriers in the same housing as the single channel barriers.

Double grounding of intrinsically safe circuits is not permitted. The insulation voltage of the wiring and field devices, measured with respect to ground, must be greater than 500 V AC. The permissible ambient temperature of the Zener Barriers is between -20 °C to 60 °C (-4 °F to 140 °F).

Edition 908837 (US) / 208599 (EU) 11/2010

Grounding of Zener Barriers

Intrinsically safe circuits with Zener Barriers without galvanic isolation must be grounded. The cross-section of the ground connection, using a copper conductor, must be at least 4 mm^2 (12 AWG) (for further details see NEC 504-50 and EN 60079-14). The maintenance of these requirements prevents the occurrence of a dangerous potential with respect to ground.

A fault of the type illustrated in Figure 7 can cause a dangerous spark if the Zener Barrier is not grounded. If a fault occurs (see Figure 8), the Zener diodes conducts and the current is shunted to ground. The fuse opens.

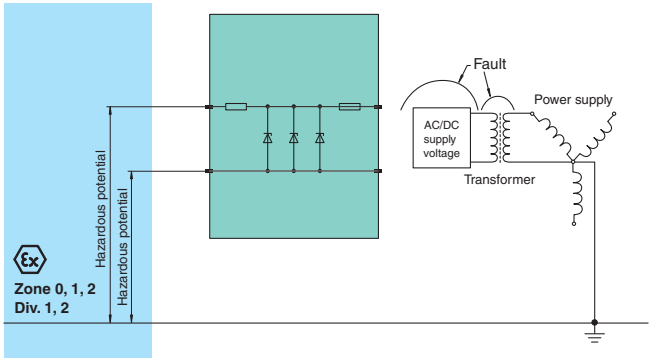


Figure 7 Non-grounded Zener Barrier

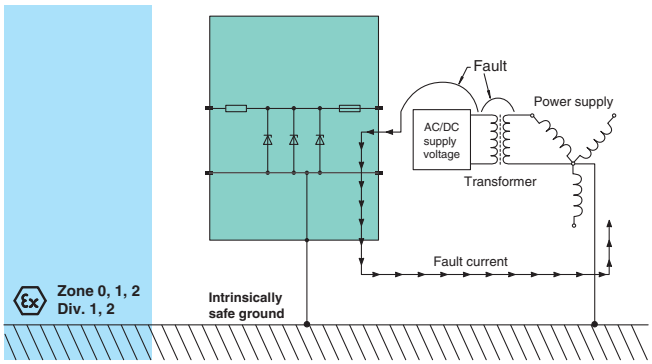


Figure 8 Grounded Zener Barriers

The system must have its own independent ground conductor, through which no supply system current flows.

Grounding with Z-System

The Z-system grounding is made simple by an integrated IS ground connection in the base of each Z-system barrier. By simply connecting each Z-System barrier to a standard 35 mm DIN rail, the total system can be grounded via a single point. Figure 9 to Figure 11 illustrate several grounding schemes. In summary, grounding may be achieved in 3 different arrangements: equipotential bonding via standard rail, group grounding through insulated mounting or individual grounding through insulated mounting.

Each installation method can be done with the appropriate accessories.

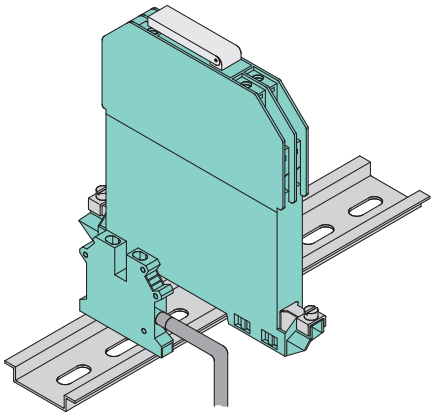


Figure 9 Equipotential bonding via DIN rail

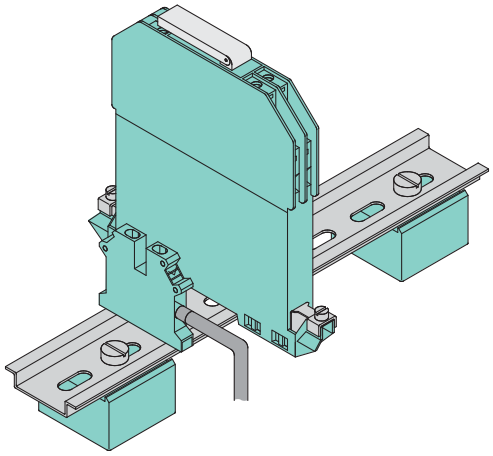


Figure 10 Insulated mounting (group grounding)

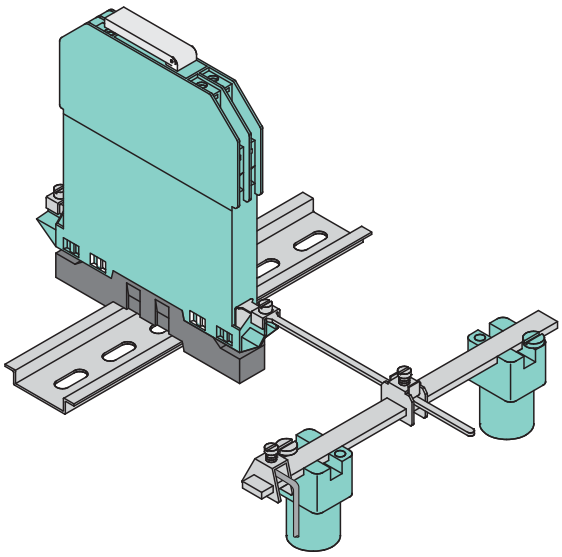


Figure 11 Insulated mounting (individual grounding)

Edition 908837 (US) / 208599 (EU) 11/2010

Multi-channel barriers

Analog circuits are often connected to two-channel barriers (see Figure 13). Since there is no grounding on this type of circuit, the system is a quasi-floating one. It is termed "quasi-floating", because it is "one zener voltage" above the ground potential. Although it does not actually float, the signal-to-noise ratio is improved.

A further advantage of multi-channel Zener Barriers is that a higher packing density can be achieved.

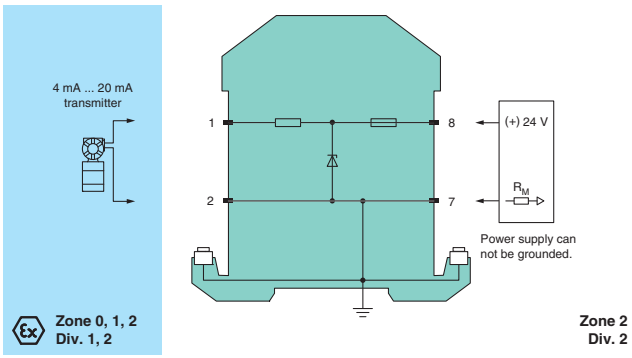


Figure 12 Single-channel Zener Barrier

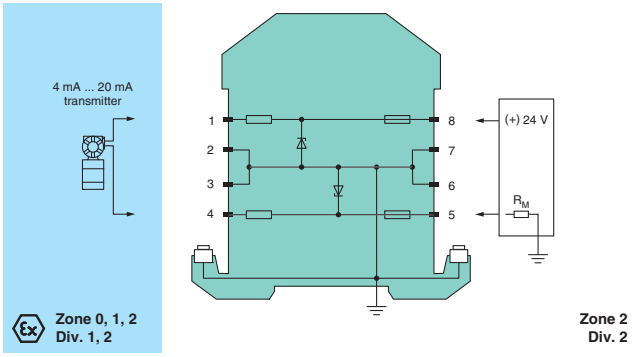


Figure 13 Two-channel Zener Barrier

Z-System specifications

The following are typical data used in the description of a barrier.

Working voltage at 10 µA

The maximum voltage that can be applied between the contacts in the safe area and ground at a defined leakage current. This is the upper value of the recommended operating range.

Maximum series resistance (Ω)

This is the maximum resistance that can be measured between the two end terminals of a barrier channel. It is obtained from the sum of any resistors and the resistance value of the fuse at an ambient temperature of 20 °C (68 °F).

Fuse rating (mA)

The function of the fuse is to create an open circuit in the event of a power supply fault. It also protects the Zener diodes from damage in the event of an abnormal operating condition.

Maximum supply voltage

The maximum voltage that can be supplied between the terminals in the safe area and ground without the fuse responding. This value is determined for an intrinsically safe circuit and an ambient temperature of 20 °C (68 °F).

Polarity

Zener Barriers are available in various versions. On Zener Barriers for positive polarity the anodes of the Zener diodes are grounded. On barriers for negative polarity the cathodes are grounded. On barriers for alternating polarity (AC), interconnected Zener diodes are employed and one side is grounded. These barriers can be used for both alternating voltage signals and direct voltage signals.

Edition 908837 (US) / 208599 (EU) 11/2010

Safety information

The corresponding data sheets, the Declaration of Conformity, the EC-Type Examination Certificate and applicable certificates (see data sheet) are an integral part of this document.

Intended use

Laws and regulations applicable to the usage or planned purpose of usage must be observed. Devices are only approved for proper usage in accordance with intended use. Improper handling will result in voiding of any warrantee or manufacturer's responsibility.

Devices that have intrinsically safe control circuits are used to operate field devices within hazardous areas.

Zener Barriers are not suitable for the isolation of signals in power engineering unless specified in the respective data sheet.

Protection of operating personnel and the system is not ensured if the product is not used in accordance with its intended use.

Intrinsic safety circuits that were operated with circuits of other types of protection may not be used as intrinsically safe circuits afterwards.

Installation and commissioning

Commissioning and installation must by carried out by specially trained qualified personnel only.

Installation of the interface devices in the safe area

The devices are constructed to satisfy the IP20 protection classification and must be protected accordingly from adverse environmental conditions such as water spray or dirt exceeding the pollution degree 2.

The devices must be installed outside the hazardous area!

Depending on the level of protection, the intrinsically safe circuits of the devices (light blue identification on the device) can be located in the hazardous area. It is especially important to ensure that the intrinsically safe circuits are safely separated from all non-intrinsically safe circuits.

The installation of the intrinsically safe circuits is to be conducted in accordance with the relevant installation regulations.

The respective peak values of the field device and the associated device with regard to explosion protection should be considered when connecting intrinsically safe field devices with the intrinsically safe circuits of Zener Barriers (demonstration of intrinsic safety). EN 60079-14/ IEC 60079-14 or NEC and CEC electrical codes for US and Canada respectively must be observed (where appropriate). If available, also the product certification control drawing must be observed.

If more channels of one device are to be connected in parallel, it must be ensured that the parallel connection is made directly at the terminals. For the demonstration of intrinsic safety, the maximum values of the parallel connection are to be regarded.

The EC-Type Examination Certificates or standard certificates/approvals should be observed. It is especially important to observe the "special conditions" if these are included in the certificates.

Installation and commissioning of the interface devices within Zone 2/Div. 2 of the hazardous area

Only devices with the corresponding manufacturer's Declaration of Conformity or separate certificate of conformity can be installed in Zone 2/Div. 2.

The individual data sheets indicate whether these conditions are met.

For US and Canada installations, in Zone 2/Div. 2 follow the NEC and CEC wiring methods. The enclosure must be able to accept Zone 2/Div. 2 wiring methods. The referenced product certification control drawing must be observed.

For all other applications, the devices should be installed in a switch or junction box that:

- meets at least IP54 in accordance to EN 60529.
- meets the requirements of resistance to light and resistance to impact according to EN 60079-0/ IEC 60079-0.
- meets the requirements of thermal endurance according to EN 60079-15/IEC 60079-15.
- must not cause ignition danger by electrostatic charge during intended use, maintenance and cleaning.

Depending on the level of protection, the intrinsically safe circuits of the devices (light blue identification on the device) can be located in the hazardous area. It is especially important to ensure that the intrinsically safe circuits are safely separated from all non-intrinsically safe circuits.

The installation of the intrinsically safe circuits is to be conducted in accordance with the relevant installation regulations.

The respective peak values of the field device and the associated device with regard to explosion protection should be considered when connecting intrinsically safe field devices with the intrinsically safe circuits of Zener Barriers (demonstration of intrinsic safety). EN 60079-14/ IEC 60079-14 or NEC and CEC electrical codes for US and Canada respectively must be observed (where appropriate). If available, also the product certification control drawing must be observed.

If more channels of one device are to be connected in parallel, it must be ensured that the parallel connection is made directly at the terminals. For the demonstration of intrinsic safety, the maximum values of the parallel connection are to be regarded.

The EC-Type Examination Certificates or standard certificates/approvals should be observed. It is especially important to observe the "special conditions" if these are included in the certificates.

Edition 908837 (US) / 208599 (EU) 11/2010

Repair and maintenance

The transfer characteristics of the devices remain stable over long periods of time. This eliminates the need for regular adjustment. Maintenance is not required.

Fault elimination

No changes can be made to devices that are operated in hazardous areas. Repairs on the device are also not allowed.

Isolation coordinates for devices with Ex-certificate according to EN 50020 and EN 60079-11

The devices are assessed for pollution degree 2 and overvoltage category II according to EN 50178.

For additional details, see data sheets.

Technical data

Electrical data

Directive conformity

Directive 94/9/EC, associated standards see valid EC-Type Examination Certificates and/or EU statements of conformity or other appropriate certificates.

For additional details, see data sheets.

Mechanical data

Mounting

Snap-on 35 mm standard DIN rail acc. to EN 60715

Protection degree

IP20 acc. to EN 60529

Housing material

Polycarbonate (PC)

Connection options

Self-opening terminals, max. core cross section 2 x 2.5 mm^2 (2 x 14 AWG)

The barriers are usually installed in racks or control cabinets.

They can be built into housings under production conditions, with the provision that the housing must allow for adequate protection. They can also be employed in hazardous areas, when it has been ascertained that the housing has been certified for this purpose.

The installation must be carried out in such a way that the intrinsic safety is not compromised by the following factors:

- Danger of mechanical damage
- Non-authorized changes or influence exerted by external personnel
- Humidity, dust or foreign bodies
- Ambient temperature exceeding the permissible level
- The connection of non-intrinsically safe circuits to intrinsically safe circuits

Grounding of the mounting rail is of the normal type, i. e. where both ends are connected to the intrinsically safe ground. This also simplifies checking the grounding.

Many installations provide the option of subsequent expansion.

Replacement cable for this spare cable can be connected to the Z799 dummy barrier and unused cable can be connected to the intrinsically safe ground.

Ambient conditions

Ambient temperature

-20 °C to 60 °C (-4 °F to 140 °F)

Storage temperature

-25 °C to 70 °C (-13 °F to 158 °F)

Relative humidity

max. 75 % without moisture condensation

Terminal designations

For additional details, see data sheets.

Edition 908837 (US) / 208599 (EU) 11/2010

Edition 908837 (US) / 208599 (EU) 11/2010

Pepperl+Fuchs Group
www.pepperl-fuchs.com
USA: +1 330 486 0002
pa-info@us.pepperl-fuchs.com
Germany: +49 621 776 2222
pa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091
pa-info@sg.pepperl-fuchs.com

DC Versions, positive polarity

Model Number	Channels	Electrical Data				Features						Page
		Working Voltage at 10 µA (V)	Max. Series Resistance (Ω)	Fuse Rating (mA)	Max. Supply Voltage (V)	Asymmetrical Version	High Power Version	Increased Nominal Resistance	Internal Measuring Resistor	Replaceable Fuse	Diode Return	
Z705	1	0.9 (1 µA)	18.18	250	4.8							425
Z710	1	6.5	56	100	8.9							425
Z713	1	13.7	29	160	14.6							425
Z715	1	13	107	100	13.6							425
Z715.1K	1	13	1025	100	13.6			■				425
Z715.F	1	13	121	63	13.8					■		426
Z722	1	19	166	50	20.1							425
Z728	1	26.5	327	50	28							425
Z728.F	1	26.5	341	50	28					■		426
Z728.H	1	26.5	250	80	28		■					425
Z728.H.F	1	26.5	273	50	28		■			■		426
Z755	2	0.9 (1 µA)	18.18	250	4.8							427
Z757	2	6	15.5	200	6.9							427
Z764	2	10	1033	50	11							427
Z765	2	13	107	100	13.6							427
Z765.F	2	13	121	63	13.9					■		431
Z772	2	19	166	50	20.1							427
Z778	2	26.5	646	50	28							427
Z779	2	26.5	327	50	28							427
Z779.F	2	26.5	341	50	28					■		431
Z779.H	2	26.5	250	80	28		■					428
Z779.H.F	2	26.5	273	50	28		■			■		431
Z786	2	26.5	36 + 0.9 V	50	28						■	427
Z787	2	26.5	327	50	28						■	428
Z787.F	2	26.5	341	50	28					■	■	432
Z787.H	2	26.5	250	80	28		■				■	428
Z787.H.F	2	26.5	273	50	28		■			■	■	432
Z788	2	26.5/6.5	327/64	50/50	28/9.1	■						428
Z788.H	2	26.5/6.5	250/64	80/80	28/9.1	■	■					428
Z788.R	2	26.5/6.5	327/64	50/50	28/9.1	■			■			429
Z789	2	26.5	640	50	27.5						■	430
Z796	2	24/18	340/437	50/50	25.1/19.5	■						428

Edition 908837 (US) / 208599 (EU) 11/2010

DC Versions, negative polarity

Model Number	Channels	Electrical Data				Features				Page
		Working Voltage at 10 µA (V)	Max. Series Resistance (Ω)	Fuse Rating (mA)	Max. Supply Voltage (V)	Asymmetrical Version	High Power Version	Replaceable Fuse	Diode Return	
Z810	1	6.5	56	100	8.9					433
Z813	1	13.7	29	160	14.6					433
Z815	1	13	107	100	13.6					433
Z822	1	19	166	50	20.1					433
Z828	1	26.5	327	50	28					433
Z828.H	1	26.5	250	80	28		■			433
Z857	2	6	15.5	200	6.9					434
Z864	2	10	1033	50	11					434
Z865	2	13	107	100	13.6					434
Z865.F	2	13	121	63	13.9			■		436
Z872	2	19	166	50	20.1					434
Z878	2	26.5	646	50	28					434
Z879.H.F	2	26.5	273	50	28		■	■		436
Z886	2	26.5	36 + 0.9 V	50	28				■	434
Z887	2	26.5	327	50	28				■	434
Z887.H.F	2	26.5	273	50	28		■	■	■	436
Z888	2	26.5/6.5	327/64	50	28/9.1	■				435
Z888.H	2	26.5/6.5	250/64	80	28/9.1	■	■			435
Z896	2	24/18	340/437	50	25.1/19.5	■				435

Edition 908837 (US) / 208599 (EU) 11/2010

Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0002 pa-info@us.pepperl-fuchs.com
Germany: +49 621 776 2222 pa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 pa-info@sg.pepperl-fuchs.com

AC Versions

Model Number	Channels	Electrical Data				Features			Page
		Working Voltage at 10 µA (V)	Max. Series resistance (Ω)	Fuse Rating (mA)	Max. Supply Voltage (V)	High Power Version	Increased Nominal Resistance	Replaceable Fuse	
Z905	1	0.9 (1 µA)	18.18	250	4.7				437
Z910	1	6.5	56	100	9.3				437
Z915	1	13	107	100	14				437
Z915.1K	1	13	1025	100	14		■		437
Z928	1	26	327	50	27.6				437
Z954	3	0.6 (1 µA)	27.27	50	4.2				442
Z955	2	0.9 (1 µA)	18.18	250	4.7				438
Z960	2	6.5	64	50	9.5				439
Z960.F	2	6.5	79	50	9.7			■	440
Z961	2	6.5	106	100	8.1				438
Z961.F	2	6.5	113	100	8			■	441
Z961.H	2	6.5	380	50	8.1	■			438
Z964	2	10	1033	50	11.7				438
Z965	2	13	115	50	14.2				439
Z966	2	10	166	50	11.7				438
Z966.F	2	10	169	63	11.9			■	441
Z966.H	2	10	82	100	11.7	■			438
Z967	2	15	136	50	16.2				439
Z972	2	19	327	50	20.9				439
Z978	2	26	646	50	27.6				439

Edition 908837 (US) / 208599 (EU) 11/2010

Accessories

Model Number	Description	Page
NS 35/7.5	35 mm DIN Rail	451
USLKG5	Terminal Block	451
Z799	Place Holder Barrier	450
ZH-ES/LB	Insertion Strip	451
ZH-Z.AB/NS	Mounting Block	451
ZH-Z.AB/SS	Mounting Block	451
ZH-Z.AK16	Connector	451
ZH-Z.AR.125	Spacing Roller	451
ZH-Z.BT	Label Carrier	451
ZH-Z.ES	Single Socket	451
ZH-Z.LL	Ground Rail Feed	451
ZH-Z.NLS-Cu3/10	Grounding Rail	451

Edition 908837 (US) / 208599 (EU) 11/2010

Pepperl+Fuchs Group
www.pepperl-fuchs.com
USA: +1 330 486 0002
pa-info@us.pepperl-fuchs.com
Germany: +49 621 776 2222
pa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091
pa-info@sg.pepperl-fuchs.com

Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z705	0.9 (1 µA)	18.18	250	4.8
Z710	6.5	56	100	8.9
Z713	13.7	29	160	14.6
Z715	13	107	100	13.6
Z715.1K	13	1025	100	13.6
Z722	19	166	50	20.1
Z728	26.5	327	50	28
Z728.H	26.5	250	80	28
Hazardous area connection				
Connection	terminals 1, 2			
Safe area connection				
Connection	terminals 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm^2			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 01 ATEX 7005			
Group, category, type of protection	⟨Ex⟩ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
UL approval				
Control drawing	116-0139			
CSA approval				
Control drawing	116-0119			
IECEx approval	IECEx BAS 09.0142			
Approved for	[zone 0] [Ex ia] IIC, [Ex iaD], [Ex ia] I			

Features

- **1-channel**
- **DC version, positive polarity**
- **DIN rail mounting**
- **Increased nominal resistance 1 kΩ (Z***.1K)**
- **High power version (Z***.H)**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

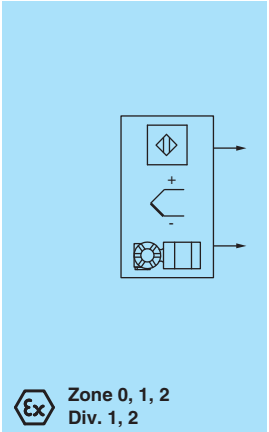
The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

The high power version has a smaller serial resistance; therefore, it produces higher voltage to the field device.

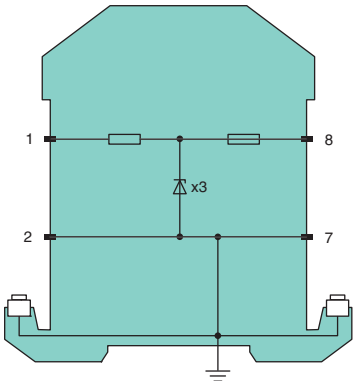
The Zener Barrier has an increased nominal resistance of 1 kΩ.

These barriers simply snap onto a standard DIN rail for easy installation and grounding.

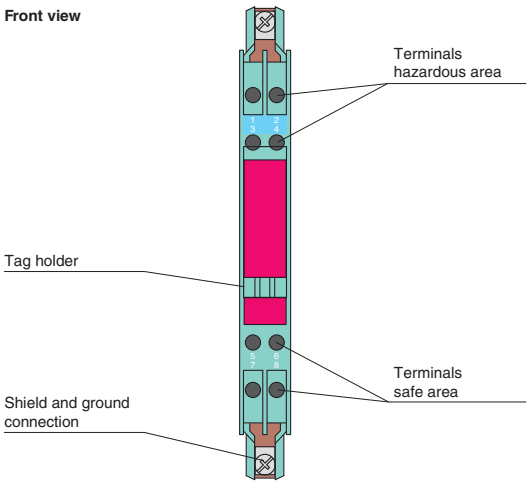
Diagrams



⟨Ex⟩ **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2



Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **1-channel**
- **DC version, positive polarity**
- **DIN rail mounting**
- **Replaceable fuse**
- **High power version (Z***.H.*)**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

Additionally this Zener Barrier is equipped with a replaceable fuse.

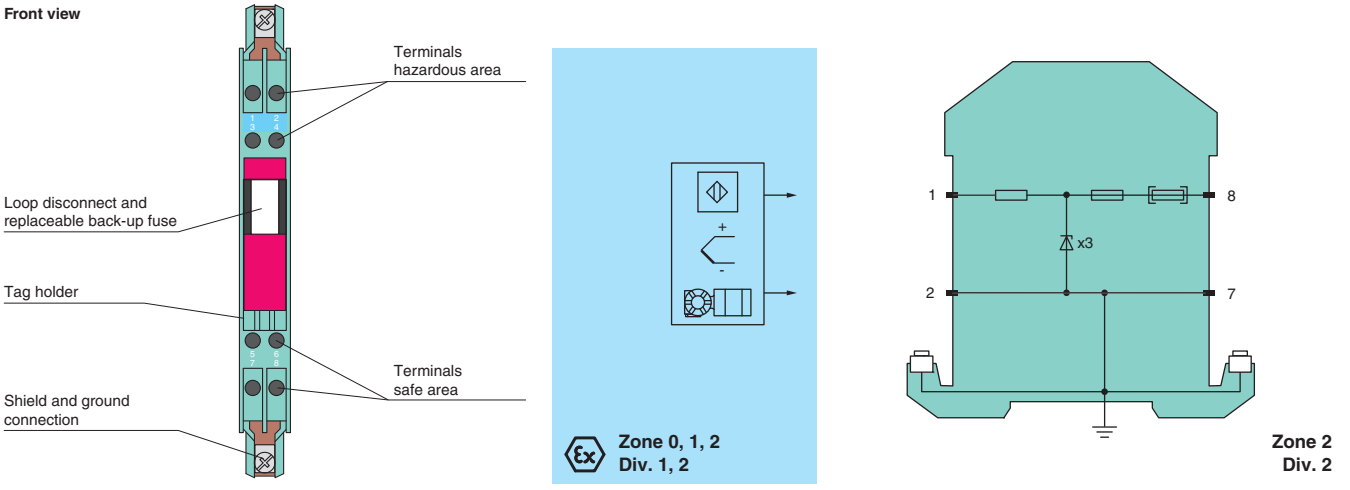
The high power version has a smaller serial resistance; therefore, it produces higher voltage to the field device.

These barriers simply snap onto a standard DIN rail for easy installation and grounding.

Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z715.F	13	121	63	13.8
Z728.F	26.5	341	50	28
Z728.H.F	26.5	273	50	28
Hazardous area connection				
Connection	terminals 1, 2			
Safe area connection				
Connection	terminals 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm^2			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 00 ATEX 7096			
Group, category, type of protection	⟨Ex⟩ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
CSA approval				
Control drawing	116-0119			

Diagrams



Edition 908837 (US) / 208599 (EU) 11/2010

Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z755	0.9 (1 µA)	18.18	250	4.8
Z757	6	15.5	200	6.9
Z764	10	1033	50	11
Z765	13	107	100	13.6
Z772	19	166	50	20.1
Z778	26.5	646	50	28
Z779	26.5	327	50	28
Z786	26.5	36 + 0.9 V	50	28
Hazardous area connection				
Connection	terminals 1, 2; 3, 4			
Safe area connection				
Connection	terminals 5, 6; 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm^2			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 01 ATEX 7005			
Group, category, type of protection	⟨Ex⟩ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
UL approval				
Control drawing	116-0139			
CSA approval				
Control drawing	116-0119			
IECEx approval	IECEx BAS 09.0142			
Approved for	[zone 0] [Ex ia] IIC, [Ex iaD], [Ex ia] I			

Features

- **2-channel**
- **DC version, positive polarity**
- **DIN rail mounting**
- **With diode return (Z786)**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

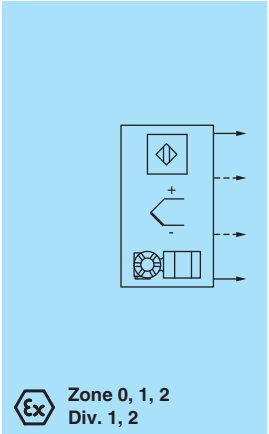
The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

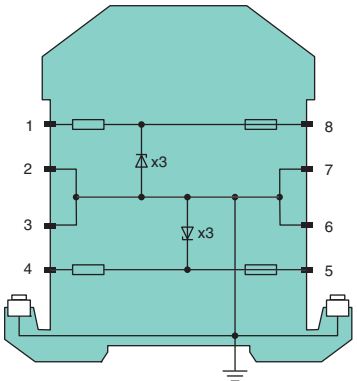
The Zener Barrier is for evaluation of signals from the hazardous area. The diodes of diode return prevent a current into the hazardous area, therefore the current assumption for intrinsic safety calculations is zero.

These barriers simply snap onto a standard DIN rail for easy installation and grounding.

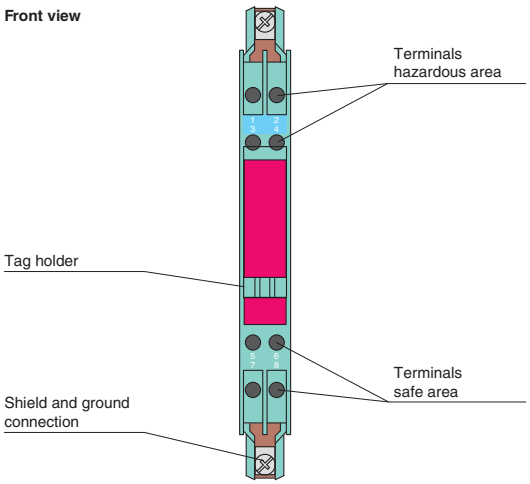
Diagrams



⟨Ex⟩ **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2



Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **2-channel**
- **DC version, positive polarity**
- **DIN rail mounting**
- **High power version (Z ***.H)**
- **Asymmetrical version (Z **8.*, Z *96)**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

The high power version has a smaller serial resistance and therefore provides higher voltage to the field device.

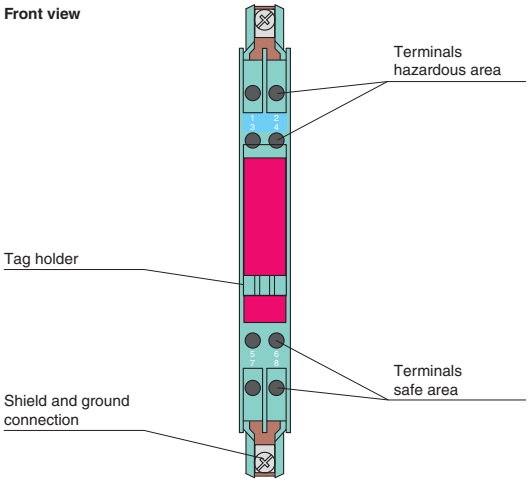
Asymmetrical Zener Barriers are for optimization of applications which have different voltage levels regarding to ground potential.

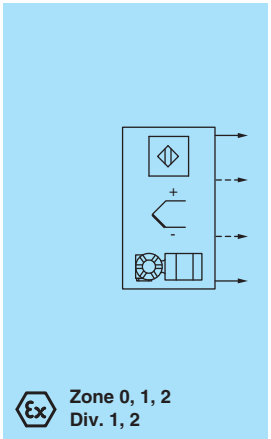
These barriers simply snap onto a standard DIN rail for easy installation and grounding.

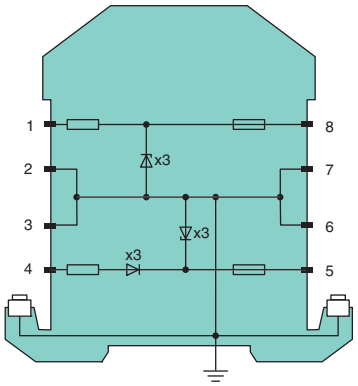
Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z779.H	26.5	250	80	28
Z787	26,5	327	50	28
Z787.H	26,5	250	80	28
Z788	26.5/6.5	327/64	50	28/9.1
Z788.H	26.5/6.5	250/64	80	28/9.1
Z796	24/18	340/437	50	25.1/19.5
Hazardous area connection				
Connection	terminals 1, 2; 3, 4			
Safe area connection				
Connection	terminals 5, 6; 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm^2			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 01 ATEX 7005			
Group, category, type of protection	⟨Ex⟩ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
UL approval				
Control drawing	116-0139			
CSA approval				
Control drawing	116-0119			
IECEx approval	IECEx BAS 09.0142			
Approved for	[zone 0] [Ex ia] IIC, [Ex iaD], [Ex ia] I			

Diagrams







Edition 908837 (US) / 208599 (EU) 11/2010

Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z788.R	26.5/6.5	327/64	50	28/9.1
Hazardous area connection				
Connection	terminals 1, 2; 3, 4			
Measuring resistor	terminals 2, 3 to 4: internal resistor 250 Ω for 5 V signal on terminals 6, 7 to 5			
Safe area connection				
Connection	terminals 5, 6; 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm²			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 01 ATEX 7005			
Group, category, type of protection	⟨Ex⟩ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
UL approval				
Control drawing	116-0139			
CSA approval				
Control drawing	116-0119			
IECEx approval	IECEx BAS 09.0142			
Approved for	[zone 0] [Ex ia] IIC, [Ex iaD], [Ex ia] I			

Features

- **2-channel**
- **DC version, positive polarity**
- **DIN rail mounting**
- **Asymmetrical version**
- **Internal measuring resistor**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

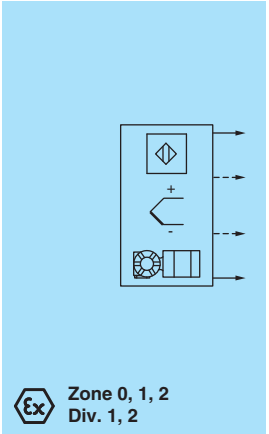
The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

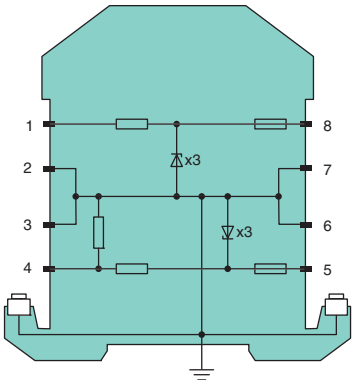
Asymmetrical Zener Barriers are for optimization of applications which have different voltage levels regarding to ground potential.

These barriers simply snap onto a standard DIN rail for easy installation and grounding.

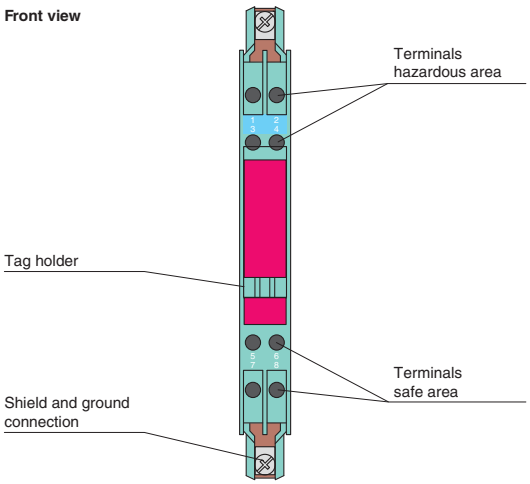
Diagrams



⟨Ex⟩ **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2



Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **2-channel**
- **DC version, positive polarity**
- **DIN rail mounting**
- **With diode return**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

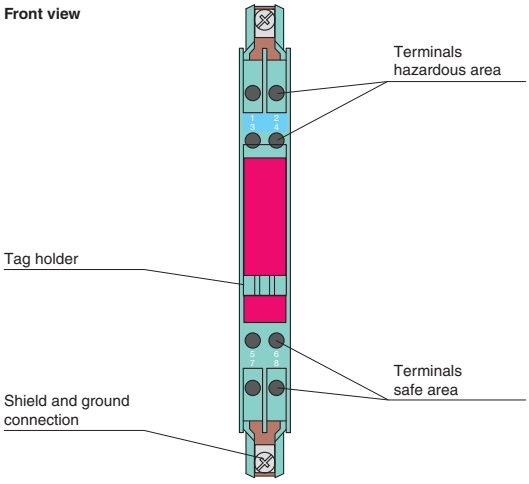
The Zener Barrier is for evaluation of signals from the hazardous area. The diodes of diode return prevent a current into the hazardous area, therefore the current assumption for intrinsic safety calculations is zero.

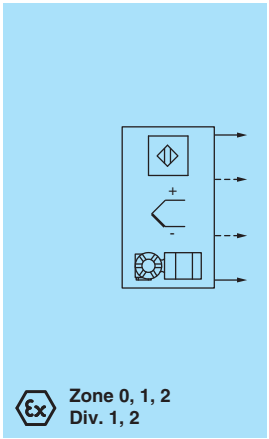
These barriers simply snap onto a standard DIN rail for easy installation and grounding.

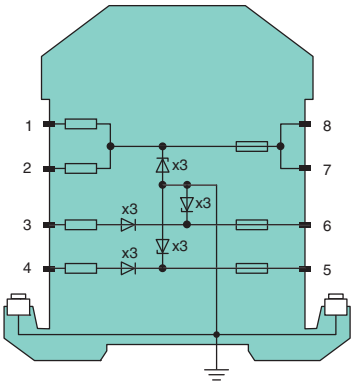
Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z789	26.5	640	50	27.5
Hazardous area connection				
Connection	terminals 1, 2; 3, 4			
Safe area connection				
Connection	terminals 5, 6; 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm^2			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 01 ATEX 7005			
Group, category, type of protection	⟨Ex⟩ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3G Ex nA II T4 [device in zone 2]			
IECEx approval	IECEx BAS 09.0142			
Approved for	[zone 0] [Ex ia] IIC, [Ex iaD], [Ex ia] I			

Diagrams







Edition 908837 (US) / 208599 (EU) 11/2010

Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z765.F	13	121	63	13.9
Z779.F	26.5	341	50	28
Z779.H.F	26.5	273	50	28
Hazardous area connection				
Connection	terminals 1, 2; 3, 4			
Safe area connection				
Connection	terminals 5, 6; 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm^2			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 00 ATEX 7096			
Group, category, type of protection	⟨Ex⟩ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
CSA approval				
Control drawing	116-0119			

Features

- **2-channel**
- **DC version, positive polarity**
- **DIN rail mounting**
- **Replaceable fuse**
- **High power version (Z ***.H.*)**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

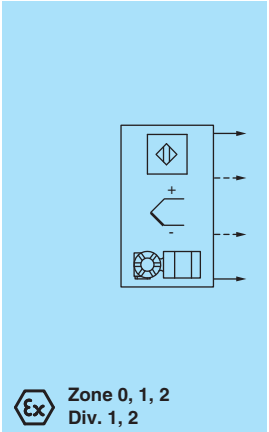
The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

Additionally this Zener Barrier is equipped with a replaceable fuse.

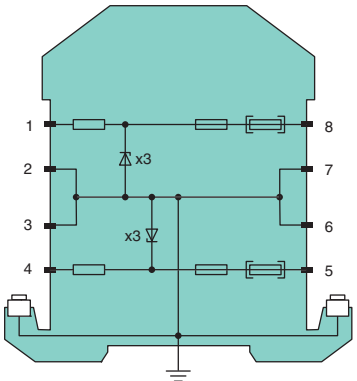
The high power version has a smaller serial resistance; therefore, it produces higher voltage to the field device.

These barriers simply snap onto a standard DIN rail for easy installation and grounding.

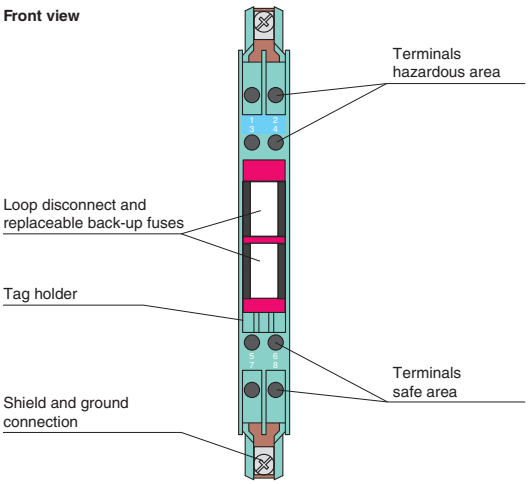
Diagrams



⟨Ex⟩ **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2



Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **2-channel**
- **DC version, positive polarity**
- **DIN rail mounting**
- **Replaceable fuse**
- **With diode return**
- **High power version (Z ***.H.*)**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

Additionally this Zener Barrier is equipped with a replaceable fuse.

The high power version has a smaller serial resistance and therefore provides higher voltage to the field device.

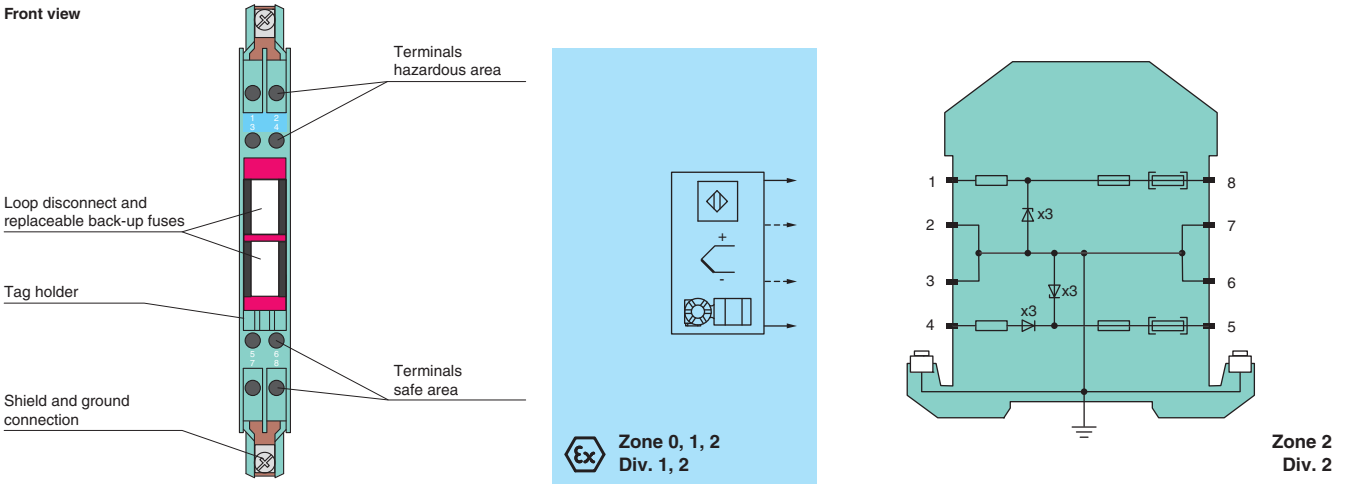
The Zener Barrier is for evaluation of signals from the hazardous area. The diodes of diode return prevent a current into the hazardous area, therefore the current assumption for intrinsic safety calculations is zero.

These barriers simply snap onto a standard DIN rail for easy installation and grounding.

Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z787.F	26.5	341	50	28
Z787.H.F	26.5	273	50	28
Hazardous area connection				
Connection	terminals 1, 2; 3, 4			
Safe area connection				
Connection	terminals 5, 6; 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm²			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 00 ATEX 7096			
Group, category, type of protection	⟨Ex⟩ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
CSA approval				
Control drawing	116-0119			

Diagrams



Edition 908837 (US) / 208599 (EU) 11/2010

Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0002 pa-info@us.pepperl-fuchs.com
Germany: +49 621 776 2222 pa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 pa-info@sg.pepperl-fuchs.com

Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z810	6.5	56	100	8.9
Z813	13.7	29	160	14.6
Z815	13	107	100	13.6
Z822	19	166	50	20.1
Z828	26.5	327	50	28
Z828.H	26.5	250	80	28
Hazardous area connection				
Connection	terminals 1, 2			
Safe area connection				
Connection	terminals 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm^2			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 01 ATEX 7005			
Group, category, type of protection	⟨Ex⟩ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
UL approval				
Control drawing	116-0139			
CSA approval				
Control drawing	116-0119			
IECEx approval	IECEx BAS 09.0142			
Approved for	[zone 0] [Ex ia] IIC, [Ex iaD], [Ex ia] I			

Features

- **1-channel**
- **DC version, negative polarity**
- **DIN rail mounting**
- **Increased nominal resistance 1 kΩ (Z***.1K)**
- **High power version (Z***.H)**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

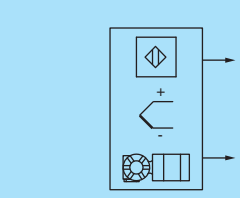
The Zener Barrier has a negative polarity, i. e. the cathodes of the Zener diodes are grounded.

The high power version has a smaller serial resistance; therefore, it produces higher voltage to the field device.

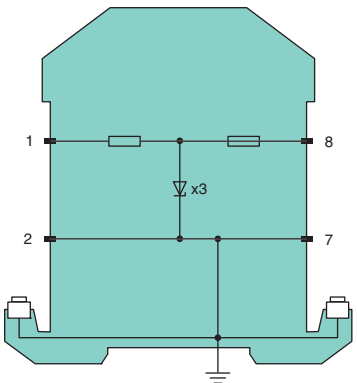
The Zener Barrier has an increased nominal resistance of 1 kΩ.

These barriers simply snap onto a standard DIN rail for easy installation and grounding.

Diagrams

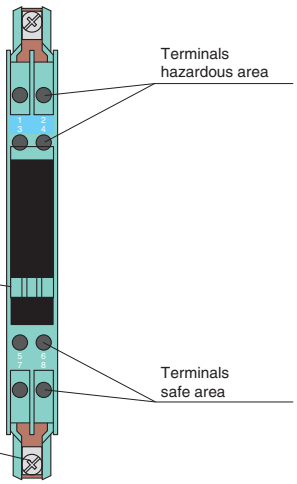


⟨Ex⟩ **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2

Front view



Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **2-channel**
- **DC version, negative polarity**
- **DIN rail mounting**
- **With diode return (Z886, Z887)**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a negative polarity, i. e. the cathodes of the Zener diodes are grounded.

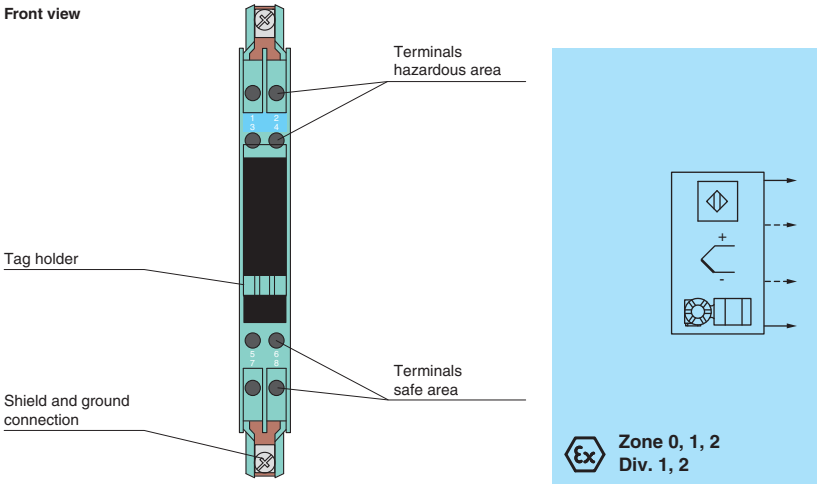
The Zener Barrier is for evaluation of signals from the hazardous area. The diodes of diode return prevent a current into the hazardous area, therefore the current assumption for intrinsic safety calculations is zero.

These barriers simply snap onto a standard DIN rail for easy installation and grounding.

Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z857	6	15.5	200	6.9
Z864	10	1033	50	11
Z865	13	107	100	13.6
Z872	19	166	50	20.1
Z878	26.5	646	50	28
Z886	26.5	36 + 0.9 V	50	28
Z887	26.5	327	50	28
Hazardous area connection				
Connection	terminals 1, 2; 3, 4			
Safe area connection				
Connection	terminals 5, 6; 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm^2			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 01 ATEX 7005			
Group, category, type of protection	⟨Ex⟩ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
UL approval				
Control drawing	116-0139			
CSA approval				
Control drawing	116-0119			
IECEx approval	IECEx BAS 09.0142			
Approved for	[zone 0] [Ex ia] IIC, [Ex iaD], [Ex ia] I			

Diagrams



Edition 908837 (US) / 208599 (EU) 11/2010

2-Channel DC Version, Negative Polarity

Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z888	26.5/6.5	327/64	50/50	28/9.1
Z888.H	26.5/6.5	250/64	80/80	28/9.1
Z896	24/18	340/437	50/50	25.1/19.5
Hazardous area connection				
Connection	terminals 1, 2; 3, 4			
Safe area connection				
Connection	terminals 5, 6; 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 01 ATEX 7005			
Group, category, type of protection	⟨Ex⟩ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
UL approval				
Control drawing	116-0139			
CSA approval				
Control drawing	116-0119			
IECEx approval	IECEx BAS 09.0142			
Approved for	[zone 0] [Ex ia] IIC, [Ex iaD], [Ex ia] I			

Features

- **2-channel**
- **DC version, negative polarity**
- **DIN rail mounting**
- **High power version (Z ***.H)**
- **Asymmetrical version**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

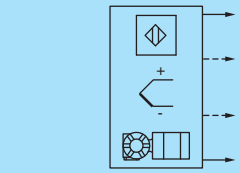
The Zener Barrier has a negative polarity, i. e. the cathodes of the Zener diodes are grounded.

The high power version has a smaller serial resistance and therefore provides higher voltage to the field device.

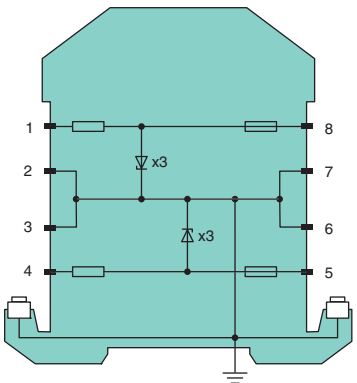
Asymmetrical Zener Barriers are for optimization of applications which have different voltage levels regarding to ground potential.

These barriers simply snap onto a standard DIN rail for easy installation and grounding.

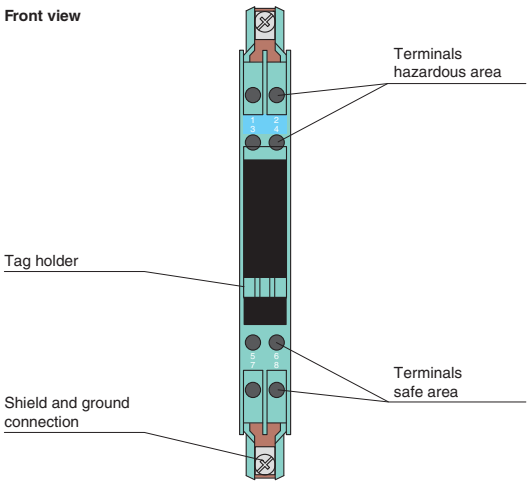
Diagrams



⟨Ex⟩ **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2



Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **2-channel**
- **DC version, negative polarity**
- **DIN rail mounting**
- **Replaceable fuse**
- **High power version (Z ***.H.*)**
- **With diode return (Z887.H.F)**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a negative polarity, i. e. the cathodes of the Zener diodes are grounded.

Additionally this Zener Barrier is equipped with a replaceable fuse.

The high power version has a smaller serial resistance and therefore provides higher voltage to the field device.

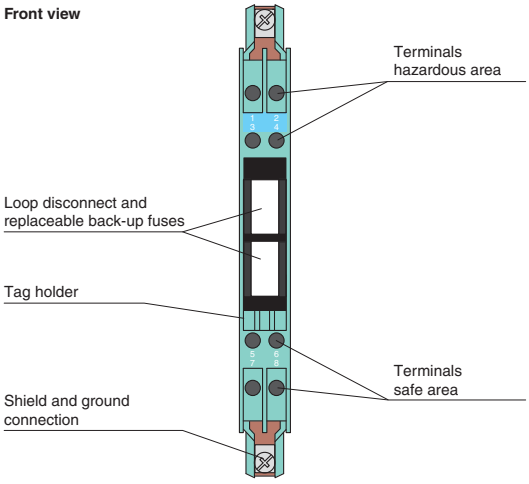
The Zener Barrier is for evaluation of signals from the hazardous area. The diodes of diode return prevent a current into the hazardous area, therefore the current assumption for intrinsic safety calculations is zero.

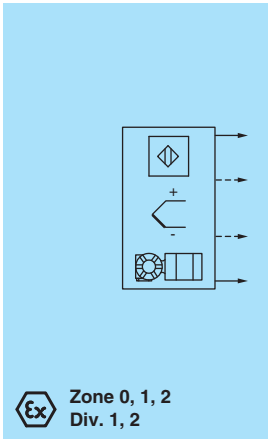
These barriers simply snap onto a standard DIN rail for easy installation and grounding.

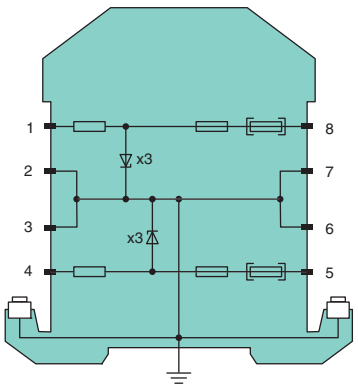
Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z865.F	13	121	63	13.9
Z879.H.F	26.5	273	50	28
Z887.H.F	26.5	273	50	28
Hazardous area connection				
Connection	terminals 1, 2; 3, 4			
Safe area connection				
Connection	terminals 5, 6; 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm²			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 00 ATEX 7096			
Group, category, type of protection	Ⓔx II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	Ⓔx II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
CSA approval				
Control drawing	116-0119			

Diagrams







Edition 908837 (US) / 208599 (EU) 11/2010

Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z905	0.9 (1 µA)	18.18	250	4.7
Z910	6.5	56	100	9.3
Z915	13	107	100	14
Z915.1K	13	1025	100	14
Z928	26	327	50	27.6
Hazardous area connection				
Connection	terminals 1, 2			
Safe area connection				
Connection	terminals 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm^2			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 01 ATEX 7005			
Group, category, type of protection	⟨Ex⟩ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
UL approval				
Control drawing	116-0139			
CSA approval				
Control drawing	116-0119			
IECEx approval	IECEx BAS 09.0142			
Approved for	[zone 0] [Ex ia] IIC, [Ex iaD], [Ex ia] I			

Features

- **1-channel**
- **AC version**
- **DIN rail mounting**
- **Increased nominal resistance 1 kΩ (Z ***.1K)**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

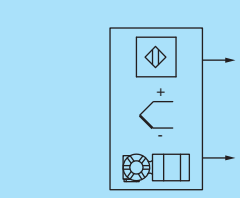
The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has alternating polarities, i. e. interconnected Zener diodes are employed and one side is grounded. The Zener Barrier can be used for both alternating voltage signals and direct voltage signals.

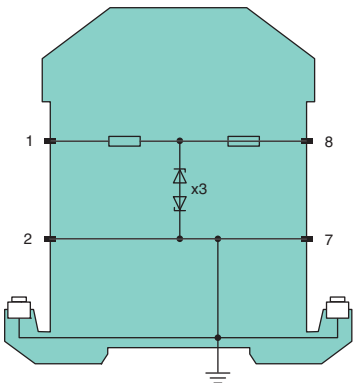
The Zener Barrier has an increased nominal resistance of 1 kΩ .

These barriers simply snap onto a standard DIN rail for easy installation and grounding.

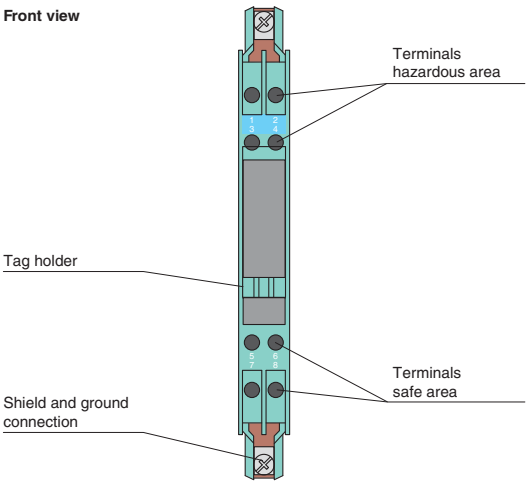
Diagrams



⟨Ex⟩ **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2



Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **2-channel**
- **AC version**
- **DIN rail mounting**
- **High power version (Z ***.H)**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has alternating polarities, i. e. interconnected Zener diodes are employed and one side is grounded. The Zener Barrier can be used for both alternating voltage signals and direct voltage signals.

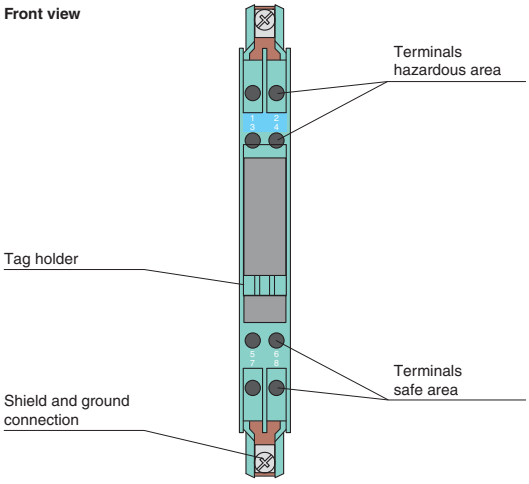
The high power version has a smaller serial resistance and therefore provides higher voltage to the field device.

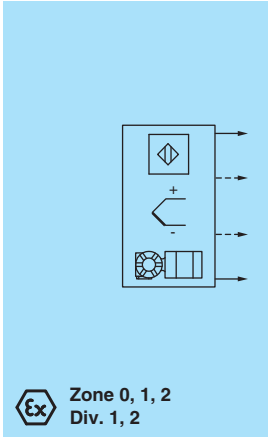
These barriers simply snap onto a standard DIN rail for easy installation and grounding.

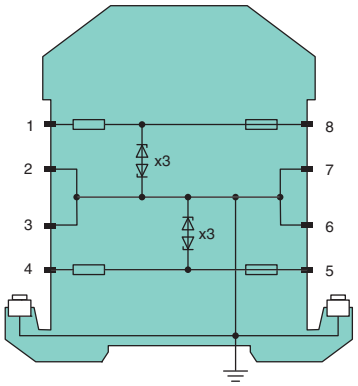
Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z955	0.9 (1 µA)	18.18	250	4.7
Z961	6.5	106	100	8.1
Z961.H	6.5	380	50	8.1
Z964	10	1033	50	11.7
Z966	10	166	50	11.7
Z966.H	10	82	100	11.7
Hazardous area connection				
Connection	terminals 1, 2; 3, 4			
Safe area connection				
Connection	terminals 5, 6; 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm^2			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 01 ATEX 7005			
Group, category, type of protection	⟨Ex⟩ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
UL approval				
Control drawing	116-0139			
CSA approval				
Control drawing	116-0119			
IECEx approval	IECEx BAS 09.0142			
Approved for	[zone 0] [Ex ia] IIC, [Ex iaD], [Ex ia] I			

Diagrams







Edition 908837 (US) / 208599 (EU) 11/2010

Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z960	6.5	64	50	9.5
Z965	13	115	50	14.2
Z967	15	136	50	16.2
Z972	19	327	50	20.9
Z978	26	646	50	27.6
Hazardous area connection				
Connection	terminals 1, 2; 3, 4			
Safe area connection				
Connection	terminals 5, 6; 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm^2			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 01 ATEX 7005			
Group, category, type of protection	⟨Ex⟩ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
UL approval				
Control drawing	116-0139			
CSA approval				
Control drawing	116-0119			
IECEx approval	IECEx BAS 09.0142			
Approved for	[zone 0] [Ex ia] IIC, [Ex iaD], [Ex ia] I			

Features

- **2-channel**
- **AC version**
- **DIN rail mounting**
- **Star connection**

Function

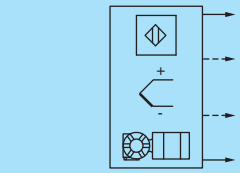
The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

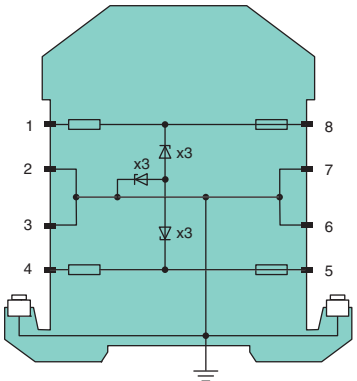
The Zener Barrier has alternating polarities, i. e. interconnected Zener diodes are employed and one side is grounded. The Zener Barrier can be used for both alternating voltage signals and direct voltage signals.

These barriers simply snap onto a standard DIN rail for easy installation and grounding.

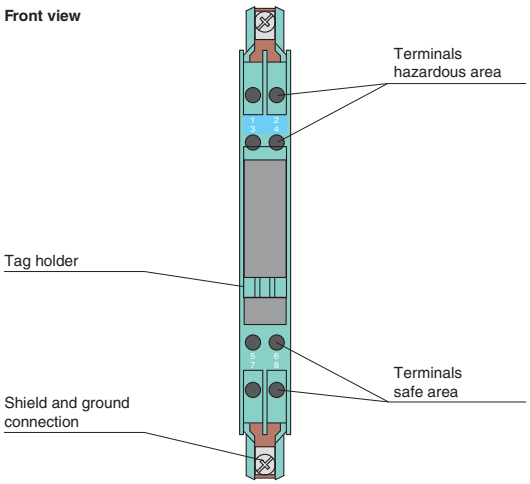
Diagrams



⟨Ex⟩ **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2



Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **2-channel**
- **AC version**
- **DIN rail mounting**
- **Replaceable fuse**
- **Star connection**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has alternating polarities, i. e. interconnected Zener diodes are employed and one side is grounded. The Zener Barrier can be used for both alternating voltage signals and direct voltage signals.

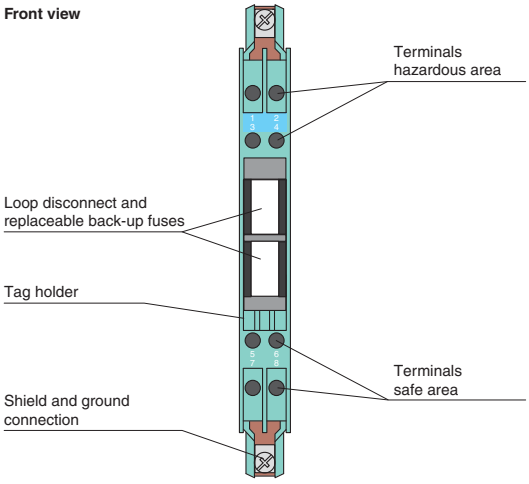
Additionally this Zener Barrier is equipped with a replaceable fuse.

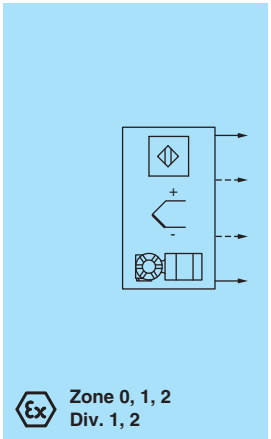
These barriers simply snap onto a standard DIN rail for easy installation and grounding.

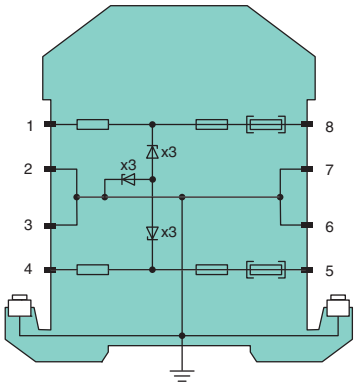
Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z960.F	6.5	79	50	9.7
Hazardous area connection				
Connection	terminals 1, 2; 3, 4			
Safe area connection				
Connection	terminals 5, 6; 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm^2			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 00 ATEX 7096			
Group, category, type of protection	Ⓔx II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	Ⓔx II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
CSA approval				
Control drawing	116-0119			

Diagrams







Edition 908837 (US) / 208599 (EU) 11/2010

Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z961.F	6.5	113	100	8
Z966.F	10	169	63	11.9
Hazardous area connection				
Connection	terminals 1, 2; 3, 4			
Safe area connection				
Connection	terminals 5, 6; 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm^2			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 00 ATEX 7096			
Group, category, type of protection	⟨Ex⟩ II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	⟨Ex⟩ II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
CSA approval				
Control drawing	116-0119			

Features

- **2-channel**
- **AC version**
- **DIN rail mounting**
- **Replaceable fuse**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

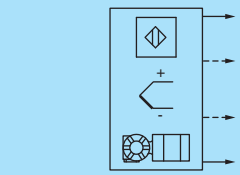
The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has alternating polarities, i. e. interconnected Zener diodes are employed and one side is grounded. The Zener Barrier can be used for both alternating voltage signals and direct voltage signals.

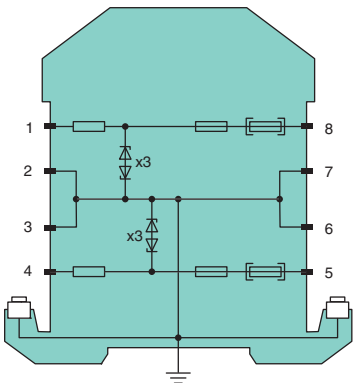
Additionally this Zener Barrier is equipped with a replaceable fuse.

These barriers simply snap onto a standard DIN rail for easy installation and grounding.

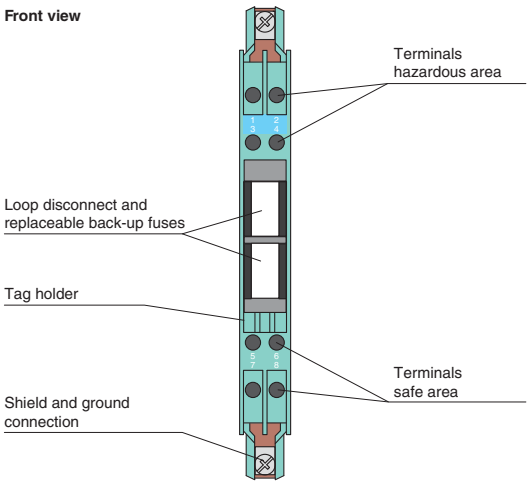
Diagrams



⟨Ex⟩ **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2



Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **3-channel**
- **AC version**
- **DIN rail mounting**

Function

The Z-System Zener Barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

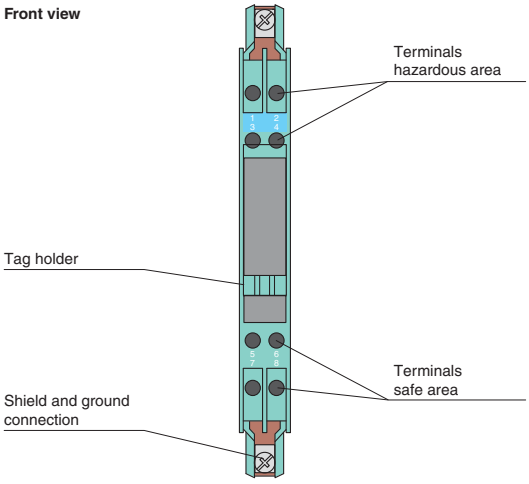
The Zener Barrier has alternating polarities, i. e. interconnected Zener diodes are employed and one side is grounded. The Zener Barrier can be used for both alternating voltage signals and direct voltage signals.

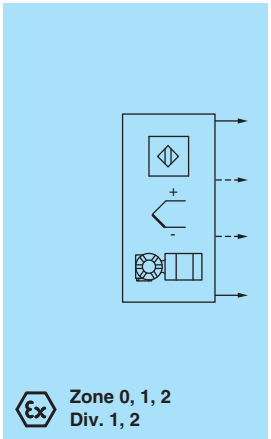
These barriers simply snap onto a standard DIN rail for easy installation and grounding.

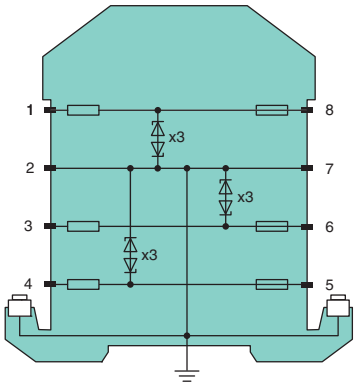
Technical data

Model number	Working voltage at 10 µA (V)	Max. series resistance (Ω)	Fuse rating (mA)	Max. supply voltage (V)
Z954	0.6 (1 µA)	27.27	50	4.2
Hazardous area connection				
Connection	terminals 1, 2; 2, 3; 2, 4			
Safe area connection				
Connection	terminals 5, 7; 6, 7; 7, 8			
Ambient conditions				
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)			
Mechanical specifications				
Protection degree	IP20			
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm^2			
Mass	approx. 150 g			
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)			
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715			
Data for application in conjunction with hazardous areas	see page 443 for entity parameters			
EC-Type Examination Certificate	BAS 01 ATEX 7005			
Group, category, type of protection	Ⓔx II (1)GD, I (M1) [Ex ia] IIC, [Ex iaD], [Ex ia] I (-20 °C ≤ T_{amb} ≤ 60 °C) [circuit(s) in zone 0/1/2]			
Statement of conformity	TÜV 99 ATEX 1484 X			
Group, category, type of protection, temperature classification	Ⓔx II 3G Ex nA II T4 [device in zone 2]			
FM approval				
Control drawing	116-0118			
UL approval				
Control drawing	116-0139			
CSA approval				
Control drawing	116-0119			
IECEx approval	IECEx BAS 09.0142			
Approved for	[zone 0] [Ex ia] IIC, [Ex iaD], [Ex ia] I			

Diagrams







Edition 908837 (US) / 208599 (EU) 11/2010

ATEX Entity Parameters

Model Number	Terminals	U_o (V)	I_o (mA)	P_o (mW)
Zener Barriers				
Z705	1, 2	4.94	504	620
Z710/Z810	1, 2	9.56	195	470
Z713/Z813	1, 2	15.75	723	2840
Z715/Z815	1, 2	14.7	150	550
Z715.1K	1, 2	14.7	15	60
Z722/Z822	1, 2	22	150	820
Z728/Z828	1, 2	28	93	650
Z728.H/Z828.H	1, 2	28	119	830
Z755	1, 2, 3, 4	4.94	504	620
Z757/Z857	1, 2, 3, 4	7.14	729	1300
Z764/Z864	1, 2, 3, 4	11.6	12	30
Z765/Z865	1, 2, 3, 4	14.7	150	550
Z772/Z872	1, 2, 3, 4	22	150	820
Z778/Z878	1, 2, 3, 4	28	46	320
Z779	1, 2, 3, 4	28	93	650
Z779.H	1, 2, 3, 4	28	119	830
Z786/Z886	1, 2, 3, 4	28	-	-
Z787/Z887	1, 2, 3, 4	28	93	650
Z787.H	1, 2, 3, 4	28	119	830
Z788/Z888	1, 2; 3, 4	1, 2: 28; 3, 4: 9.56	1, 2: 93; 3, 4: 195	1, 2: 650; 3, 4: 470
Z788.H/Z888.H	1, 2; 3, 4	1, 2: 28; 3, 4: 9.56	1, 2: 119; 3, 4: 195	1, 2: 830; 3, 4: 470
Z788.R	1, 2; 3, 4	1, 2: 28; 3, 4: 9.56	1, 2: 93; 3, 4: 195	1, 2: 650; 3, 4: 470
Z789	1, 2, 3, 4	28	91.2	638
Z796/Z896	1, 2; 3, 4	1, 2: 26.6; 3, 4: 20.5	1, 2: 85; 3, 4: 50	1, 2: 560; 3, 4: 260
Z905	1, 2	4.89	499	610
Z910	1, 2	9.94	203	500
Z915	1, 2	15	153	570
Z915.1K	1, 2	15	15	60
Z928	1, 2	28	93	650
Z954	1, 2, 3, 4	4.5	383	430
Z955	1, 2, 3, 4	4.89	499	610
Z960	1, 2, 3, 4	9.94	203	500
Z961	1, 2, 3, 4	8.7	89	190
Z961.H	1, 2, 3, 4	8.7	25	50
Z964	1, 2, 3, 4	12	12	40
Z965	1, 2, 3, 4	15	153	570
Z966	1, 2, 3, 4	12	82	240
Z966.H	1, 2, 3, 4	12	164	490
Z967	1, 2, 3, 4	16.8	143	600
Z972	1, 2, 3, 4	22	73	400
Z978	1, 2, 3, 4	28	46	320
Zener Barriers with replaceable fuse				
Z715.F	1, 2	14.7	150	550
Z728.F	1, 2	28	93	650
Z728.H.F	1, 2	28	120	830
Z765.F/Z865.F	1, 2, 3, 4	14.7	150	550
Z779.F	1, 2, 3, 4	28	93	650
Z779.H.F/Z879.H.F	1, 2, 3, 4	28	120	830
Z787.F	1, 2, 3, 4	28	93	650
Z787.H.F/Z887.H.F	1, 2, 3, 4	28	120	830
Z960.F	1, 2, 3, 4	9.94	203	510
Z961.F	1, 2, 3, 4	8.7	89	192
Z966.F	1, 2, 3, 4	12	82	240

Edition 908837 (US) / 208599 (EU) 11/2010

CSA Entity Parameters

Model Number	Terminals	V_{max} (V)	Resistance (Ω)	V_{oc} (V)	I_{sc} (mA)
Zener Barriers					
Z705	1, 2	4.7	10	4.97/-4.97	507
Z710/Z810	1, 2	9.1	50	9.97/-9.97	200
Z713/Z813	1, 2	15	22	15.75/-15.75	724
Z715/Z815	1, 2	14	100	15.2/-15.2	155
Z715.1K	1, 2	14	1000	15.2/-15.2	15.5
Z722/Z822	1, 2	22	150	22.7/-22.7	155
Z728/Z828	1, 2	28	307	28.0/-28.0	93
Z728.H/Z828.H	1, 2	28	240	28.0/-28.0	119.2
Z755	1, 2; 3, 4	4.7	10	4.97/-4.97	507
	1, 4	–	–	5.97	1014
Z757/Z857	1, 2; 3, 4	6.8	10	7.30/-7.30	745
	1, 4	–	–	8.3	1489
Z764/Z864	1, 2; 3, 4	11	1000	11.9/-11.9	12.1
	1, 4	–	–	12.9	24.3
Z765/Z865	1, 2; 3, 4	14	100	15.2/-15.2	155
	1, 4	–	–	16.2	309
Z772/Z872	1, 2; 3, 4	22	150	22.7/-22.7	155
	1, 4	–	–	24.7	309
Z778/Z878	1, 2; 3, 4	28	620	28.0/-28.0	46
	1, 4	–	–	30	93
Z779	1, 2; 3, 4	28	307	28.0/-28.0	93
	1, 4	–	–	30	186
Z779.H	1, 2; 3, 4	28	240	28.0/-28.0	119.2
	1, 4	–	–	30	235.5
Z786/Z886	1, 2; 3, 4	28	Diode	28.0/-28.0	0
	1, 4	–	–	30	0
Z787/Z887	1, 2	28	307	28.0/-28.0	93
	3, 4	28	Diode	28.0/-28.0	0
	1, 4	–	–	30	93
Z787.H	1, 2	28	240	28.0/-28.0	119.2
	3, 4	28	Diode	28.0/-28.0	0
	1, 4	–	–	30	119.2
Z788/Z888	1, 2	28	307	28.0/-28.0	93
	3, 4	9.1	50	9.77/-9.77	200
	1, 4	–	–	29	293
Z788.H/Z888.H	1, 2	28	240	28.0/-28.0	119.2
	3, 4	9.1	50	9.77/-9.77	200
	1, 4	–	–	30	319
Z788.R	1, 2	28	307	28.0/-28.0	93
	3, 4	9.1	50	9.77/-9.77	200
	1, 4	–	–	29	293
Z796/Z896	1, 2	26.6	320	27.5/-27.5	87.7
	3, 4	20.5	415	20.8/-20.8	51
	1, 4	–	–	29.5	139
Z905	1, 2	4.9	10	5.1	520
Z910	1, 2	9.7	50	10.3	210
Z915	1, 2	15	100	15.5	158
Z915.1K	1, 2	15	1000	15.5	15.8
Z928	1, 2	28	307	28	93
Z954	1, 2; 2, 3; 2, 4	4.9	12	5.1	433
	1, 2; 3, 4	–	–	10.2	1300
Z955	1, 2; 3, 4	4.9	10	5.1	520
	1, 4	–	–	10.2	1040

Edition 908837 (US) / 208599 (EU) 11/2010

Pepperl+Fuchs Group
www.pepperl-fuchs.com
USA: +1 330 486 0002
pa-info@us.pepperl-fuchs.com
Germany: +49 621 776 2222
pa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091
pa-info@sg.pepperl-fuchs.com

Model Number	Terminals	V_{max} (V)	Resistance (Ω)	V_{oc} (V)	I_{sc} (mA)
Z960	1, 2; 3, 4	9.7	50	10.3	210
	1, 4	–	–	10.3	419
Z961	1, 2; 3, 4	8.5	100	9	91.8
	1, 4	–	–	18	184
Z961.H	1, 2; 3, 4	8.5	360	9.63	26.3
	1, 4	–	–	18.5	52.5
Z964	1, 2; 3, 4	12	1000	12.4	12.6
	1, 4	–	–	24.7	25.2
Z965	1, 2; 3, 4	15	100	15.5	158
	1, 4	–	–	15.5	316
Z966	1, 2; 3, 4	12	150	12.4	84
	1, 4	–	–	24.7	168
Z966.H	1, 2; 3, 4	12	75	12.31	167.6
	1, 4	–	–	24.63	335.1
Z967	1, 2; 3, 4	16.8	120	17.3	147
	1, 4	–	–	17.3	294
Z972	1, 2; 3, 4	22	307	22.7	75.5
	1, 4	–	–	22.7	151
Z978	1, 2; 3, 4	28	620	28	46
	1, 4			28	93
Zener Barriers with replaceable fuse					
Z715.F	1, 2	14	100	15.2	155
Z728.F	1, 2	28	307	28	93
Z728.H.F	1, 2	28	240	28	119.2
Z765.F/Z865.F	1, 2; 3, 4	14	100	15.2	155
	1, 4	–	–	16.2	305
Z779.F	1, 2; 3, 4	28	307	28	93
	1, 4	–	–	30	186
Z779.H.F/Z879.H.F	1, 2; 3, 4	28	240	28	119.2
	1, 4	–	–	30	235.5
Z787.F	1, 2	28	307	28	93
	3, 4	28	Diode	28	0
	1, 4	–	–	30	93
Z787.H.F/Z887.H.F	1, 2	28	240	28	119.2
	3, 4	28	Diode	28	0
	1, 4	–	–	30	119.2
Z960.F	1, 2; 3, 4	9.7	50	10.3	210
	1, 4	–	–	10.3	419
Z961.F	1, 2; 3, 4	8.5	100	9	91.8
	1, 4	–	–	18	184
Z966.F	1, 2; 3, 4	12	150	12.4	84
	1, 4	–	–	24.7	168

Edition 908837 (US) / 208599 (EU) 11/2010

FM Entity Parameters

Model Number	Terminals	V_{oc} (V)	I_{sc} (mA)	V_t (V)	I_t (mA)
Zener Barriers					
Z705	1, 2	4.97/-4.97	507	–	–
Z710/Z810	1, 2	9.97/-9.97	200	–	–
Z713/Z813	1, 2	15.75/-15.75	724	–	–
Z715/Z815	1, 2	15.2/-15.2	155	–	–
Z715.1K	1, 2	15.2/-15.2	15.5	–	–
Z722/Z822	1, 2	22.7/-22.7	155	–	–
Z728/Z828	1, 2	28.0/-28.0	93	–	–
Z728.H/Z828.H	1, 2	28.0/-28.0	119.2	–	–
Z755	1, 2; 3, 4	4.97/-4.97	507	–	–
	1, 4	–	–	5.97	1014
Z757/Z857	1, 2; 3, 4	7.30/-7.30	745	–	–
	1, 4	–	–	8.3	1489
Z764/Z864	1, 2; 3, 4	11.9/-11.9	12.1	–	–
	1, 4	–	–	12.9	24.3
Z765/Z865	1, 2; 3, 4	15.2/-15.2	155	–	–
	1, 4	–	–	16.2	309
Z772/Z872	1, 2; 3, 4	22.7/-22.7	155	–	–
	1, 4	–	–	24.7	309
Z778/Z878	1, 2; 3, 4	28.0/-28.0	46	–	–
	1, 4	–	–	30	93
Z779	1, 2; 3, 4	28.0/-28.0	93	–	–
Z779.H	1, 2; 3, 4	28.0/-28.0	119.2	–	–
	1, 4	–	–	30	235.5
Z786/Z886	1, 2; 3, 4	28.0/-28.0	0	–	–
	1, 4	–	–	30	0
Z787/Z887	1, 2	28.0/-28.0	93	–	–
	3, 4	28.0/-28.0	0	–	–
	1, 4	–	–	30	93
Z787.H	1, 2	28.0/-28.0	119.2	–	–
	3, 4	28.0/-28.0	0	–	–
	1, 4	–	–	30	119.2
Z788/Z888	1, 2	28.0/-28.0	93	–	–
	3, 4	9.77/-9.77	200	–	–
	1, 4	–	–	29	293
Z788.H/Z888.H	1, 2	28.0/-28.0	119.2	–	–
	3, 4	9.78/-9.78	199.6	–	–
	1, 4	–	–	30	321.8
Z788.R	1, 2	28.0/-28.0	93	–	–
	3, 4	9.77/-9.77	200	–	–
	1, 4	–	–	29	293
Z796/Z896	1, 2	27.5/-27.5	87.7	–	–
	3, 4	20.8/-20.8	51	–	–
	1, 4	–	–	29.5	139
Z905	1, 2	5.1	520	–	–
Z910	1, 2	10.3	210	–	–
Z915	1, 2	15.5	158	–	–
Z915.1K	1, 2	15.5	15.8	–	–
Z928	1, 2	28	93	–	–
Z954	1, 2; 2, 3; 2, 4	5.1	433	–	–
	1, 2; 3, 4	–	–	10.2	1300
Z955	1, 2; 3, 4	5.1	520	–	–
	1, 4	–	–	10.2	1040
Z960	1, 2; 3, 4	10.3	210	–	–
	1, 4	–	–	10.3	419

Edition 908837 (US) / 208599 (EU) 11/2010

Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0002 pa-info@us.pepperl-fuchs.com
Germany: +49 621 776 2222 pa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 pa-info@sg.pepperl-fuchs.com

Model Number	Terminals	V_{oc} (V)	I_{sc} (mA)	V_t (V)	I_t (mA)
Z961	1, 2; 3, 4	9	91.8	–	–
	1, 4	–	–	18	184
Z961.H	1, 2; 3, 4	9.63	26.3	–	–
	1, 4	–	–	18.5	52.5
Z964	1, 2; 3, 4	12.4	12.6	–	–
	1, 4	–	–	24.7	25.2
Z965	1, 2; 3, 4	15.5	158	–	–
	1, 4	–	–	15.5	316
Z966	1, 2; 3, 4	12.4	84	–	–
	1, 4	–	–	24.7	168
Z966.H	1, 2; 3, 4	12.31	167.6	–	–
	1, 4	–	–	24.63	335.1
Z967	1, 2; 3, 4	17.3	147	–	–
	1, 4	–	–	17.3	294
Z972	1, 2; 3, 4	22.7	75.5	–	–
	1, 4	–	–	22.7	151
Z978	1, 2; 3, 4	28	46	–	–
	1, 4	–	–	28	93
Zener Barriers with replaceable fuse					
Z715.F	1, 2	15.2	155	–	–
Z728.F	1, 2	28	93	–	–
Z728.H.F	1, 2	28	119.2	–	–
Z765.F/Z865.F	1, 2; 3, 4	15.2	155	–	–
	1, 4	–	–	16.2	309
Z779.F	1, 2; 3, 4	28	93	–	–
	1, 4	–	–	30	186
Z779.H.F/Z879.H.F	1, 2; 3, 4	28	119.2	–	–
	1, 4	–	–	30	235.5
Z787.F	1, 2	28	93	–	–
	3, 4	28	0	–	–
	1, 4	–	–	30	93
Z787.H.F/Z887.H.F	1, 2	28	119.2	–	–
	3, 4	28	0	–	–
	1, 4	28	–	30	119.2
Z960.F	1, 4	–	–	10.3	419
Z961.F	1, 2; 3, 4	9	91.8	–	–
	1, 4	–	–	18	184
Z966.F	1, 2; 3, 4	12.4	84	–	–
	1, 4	–	–	24.7	168

Edition 908837 (US) / 208599 (EU) 11/2010

UL Entity Parameters

Model Number	Terminals	V_{oc} (V)	I_{sc} (mA)	V_t (V)	I_t (mA)
Z705	1, 2	4.94	504	–	–
Z710/Z810	1, 2	9.56	195	–	–
Z713/Z813	1, 2	15.75	723	–	–
Z715/Z815	1, 2	14.7	150	–	–
Z715.1K	1, 2	14.7	15	–	–
Z722/Z822	1, 2	22	150	–	–
Z728/Z828	1, 2	28	93	–	–
Z728.H/Z828.H	1, 2	28	119	–	–
Z755	1, 2; 3, 4	4.94	504	–	–
	1, 4	–	–	4.94	1008
Z757/Z857	1, 2; 3, 4	7.14	729	–	–
	1, 4	–	–	7.14	1457
Z764/Z864	1, 2; 3, 4	11.16	12	–	–
	1, 4	–	–	11.6	24
Z765/Z865	1, 2; 3, 4	14.7	150	–	–
	1, 4	–	–	14.7	300
Z772/Z872	1, 2; 3, 4	22	150	–	–
	1, 4	–	–	22	300
Z778/Z878	1, 2; 3, 4	28	46	–	–
	1, 4	–	–	28	93
Z779	1, 2; 3, 4	28	93	–	–
	1, 4	–	–	28	186
Z779.H	1, 2; 3, 4	28	119	–	–
	1, 4	–	–	28	238
Z786/Z886	1, 2; 3, 4	28	0	–	–
	1, 4	–	–	28	0
Z787/Z887	1, 2	28	93	–	–
	3, 4	28	0	–	–
	1, 4	–	–	28	93
Z787.H	1, 2	28	119	–	–
	3, 4	28	0	–	–
	1, 4	–	–	28	119
Z788/Z888	1, 2	28	93	–	–
	3, 4	9.56	195	–	–
	1, 4	–	–	28	288
Z788.H/Z888.H	1, 2	28	119	–	–
	3, 4	9.56	195	–	–
	1, 4	–	–	28	314
Z788.R	1, 2	28	93	–	–
	3, 4	9.56	195	–	–
	1, 4	–	–	28	288
Z796/Z896	1, 2	26.6	85	–	–
	3, 4	20.5	50	–	–
	1, 4	–	–	26.6	135
Z905	1, 2	4.89	499	–	–
Z910	1, 2	9.94	203	–	–
Z915	1, 2	15	153	–	–
Z915.1K	1, 2	15	15	–	–
Z928	1, 2	28	93	–	–
Z954	1, 2; 2, 3; 2, 4	4.5	383	–	–
	1, 2, 3; 2, 3, 4	9	765	–	–
	1, 2, 3, 4	–	–	9	1150
Z955	1, 2; 3, 4	4.89	499	–	–
	1, 4	–	–	9.78	998

Edition 908837 (US) / 208599 (EU) 11/2010

Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0002 pa-info@us.pepperl-fuchs.com
Germany: +49 621 776 2222 pa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 pa-info@sg.pepperl-fuchs.com

Model Number	Terminals	V_{oc} (V)	I_{sc} (mA)	V_t (V)	I_t (mA)
Z960	1, 2; 3, 4	9.94	203	–	–
	1, 4	–	–	9.94	406
Z961	1, 2; 3, 4	8.7	89	–	–
	1, 4	–	–	17.4	178
Z961.H	1, 2; 3, 4	8.7	25	–	–
	1, 4	–	–	17.4	49
Z964	1, 2; 3, 4	12	12	–	–
	1, 4	–	–	24	24
Z965	1, 2; 3, 4	15	153	–	–
	1, 4	–	–	15	306
Z966	1, 2; 3, 4	12	82	–	–
	1, 4	–	–	24	164
Z966.H	1, 2; 3, 4	12	164	–	–
	1, 4	–	–	24	328
Z967	1, 2; 3, 4	16.8	143		
	1, 4	–	–	16.8	286
Z972	1, 2; 3, 4	22	73		
	1, 4	–	–	22	146
Z978	1, 2; 3, 4	28	46		
	1, 4	–	–	28	93

Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **Z-System place holder module**
- **No electrical function: empty housing**
- **DIN rail mounting**

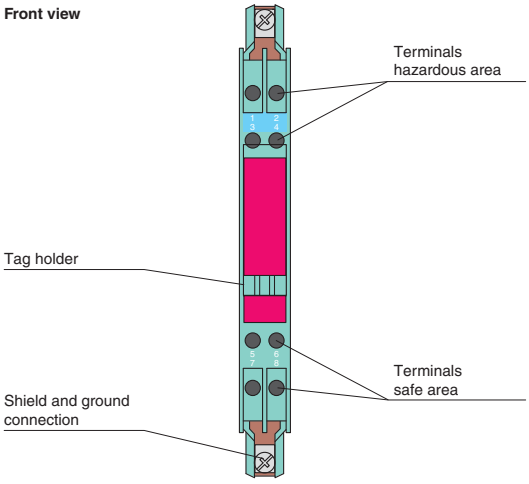
Function

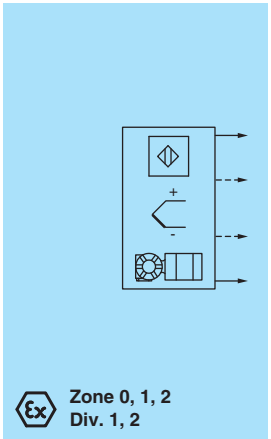
The Zener barrier is an empty housing. This device will be used as a dummy, to reserve place and wiring for future expansions.

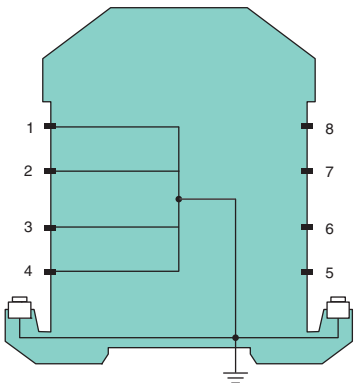
Technical data

Model number	
Z799	
Hazardous area connection	
Connection	terminals 1, 2, 3, 4
Safe area connection	
Connection	terminals 5, 6, 7, 8
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications	
Protection degree	IP20
Connection	self-opening connection terminals, max. core cross-section 2 x 2.5 mm^2
Mass	approx. 150 g
Dimensions	12.5 x 115 x 110 mm (0.5 x 4.5 x 4.3 in)
Mounting	mounting on 35 mm DIN rail acc. to DIN EN 60715

Diagrams





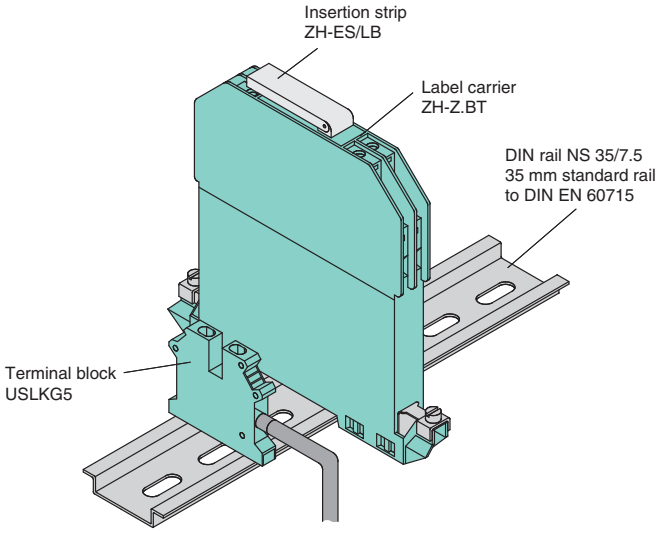


Edition 908837 (US) / 208599 (EU) 11/2010

35 mm DIN Rail
NS 35/7.5
Insertion Strip
ZH-ES/LB
Label Carrier
ZH-Z.BT
Terminal Block
USLKG5

Function

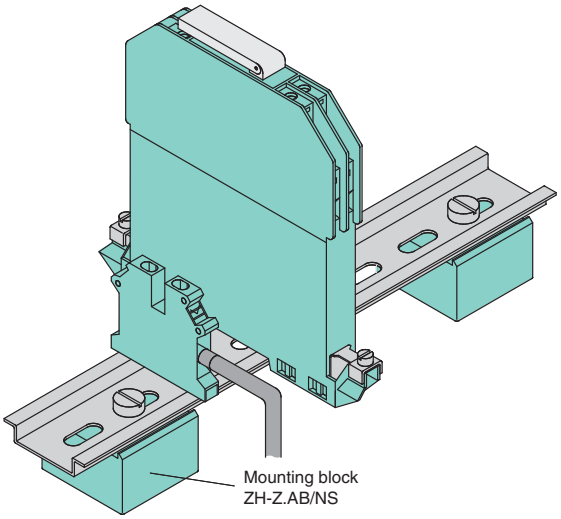
Equipotential bonding via DIN rail



Mounting Block
ZH-Z.AB/NS

Function

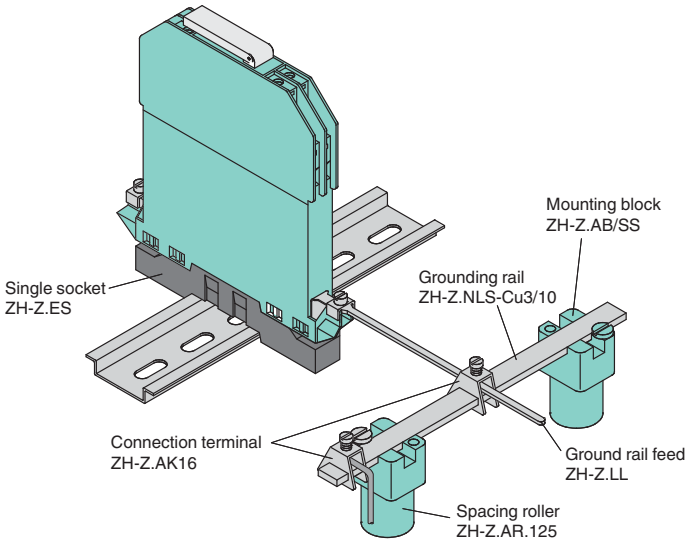
Group grounding through insulated mounting



Single Socket
ZH-Z.ES
Ground Rail Feed
ZH-Z.LL
Spacing Roller
ZH-Z.AR.125
Mounting Block
ZH-Z.AB/SS
Connector
ZH-Z.AK16
N-Combined Rail
ZH-Z.NLS-Cu3/10

Function

Individual grounding through insulated mounting



Edition 908837 (US) / 208599 (EU) 11/2010

SB-System

Edition 908837 (US) / 208599 (EU) 11/2010

Pepperl+Fuchs Group
www.pepperl-fuchs.com
USA: +1 330 486 0002
pa-info@us.pepperl-fuchs.com
Germany: +49 621 776 2222
pa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091
pa-info@sg.pepperl-fuchs.com
PEPPERL+FUCHS
PROTECTING YOUR PROCESS

Edition 908837 (US) / 208599 (EU) 11/2010

Introduction

The SB-System barriers have a full range for AC and DC intrinsic safety applications with over 100 different models to choose from. They are available in plug-in single and dual channel versions, 1, 6, or 10 position Termination Boards, and a common grounding point for multiple barrier boards. With simple DIN rail installation, replaceable fuses, and very low weight, the SB-System barriers can provide the solution for you intrinsic safety installation.

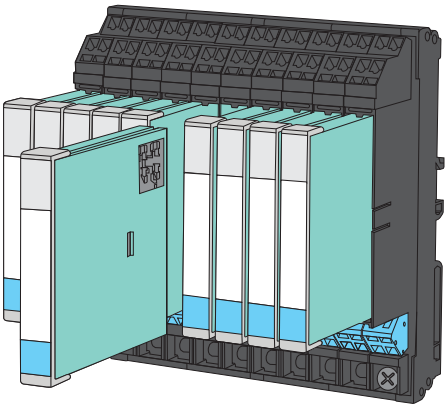


Figure 1 Zener Barrier SB-System

Housing

The SB-System as seen in Figure 2, is a unique single or dual channel plug-in Zener Barrier, with separate Termination Board available in 1, 6 or 10 positions. The SB-System barriers have a very low profile of 9.6 mm. The SB-System barriers special design does not require an epoxy fill and therefore it has an extremely low weight, which is critical for weight sensitive applications. It is constructed to a protection classification of IP20 and is equipped with cage clamp terminals, that will accept wire up to 2.5 mm^2 (14 AWG).

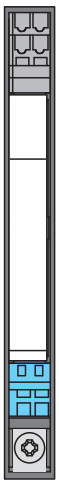


Figure 2 SB barrier in single Terminal Base

Mounting

The SB-System barrier snap on standard 35 mm DIN rail and are ideal for racks or control cabinets. They can also be located in Class I Division 2 and Zone 2 hazardous areas when installed in enclosures with the appropriate protection category.

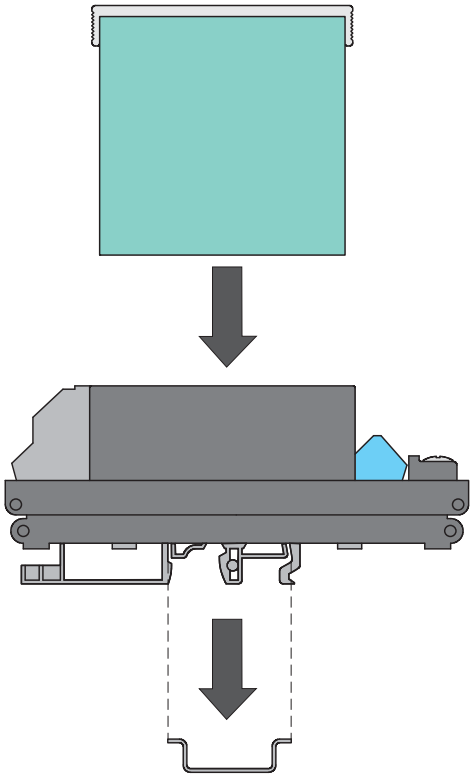


Figure 3 Mounting Zener Barrier SB-System

Operating principle

The zener diodes within the barriers are connected in the reversed biased direction. In normal operation the barrier will remain virtually transparent to the control loop.

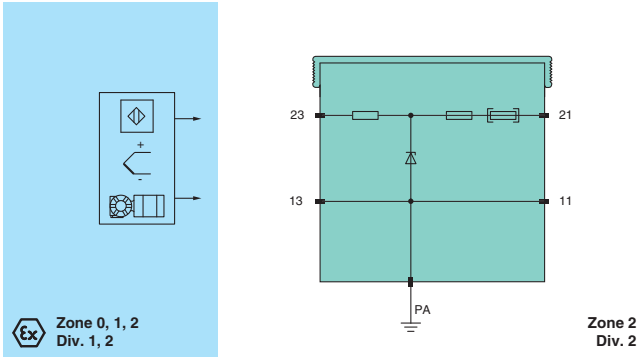


Figure 4 Circuit diagram (example)

If the diode breakdown voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to open, thus preventing the transfer of unacceptably high energy into the hazardous area.

Edition 908837 (US) / 208599 (EU) 11/2010

Terminals 11 and 21 are typically connected to a control circuit in the safe area. The single condition that the control circuitry must satisfy, is that it must not contain a source whose potential relative to earth is greater than 250 V AC or 250 V DC.

Terminals 13 and 23 are connected to the intrinsically safe circuits (field device) in the hazardous area. These types of devices are referred to as the intrinsically safe apparatus and must be certificated unless the electrical values do not exceed any of the following values: 1.5 V, 0.1 A, 25 mW. Pepperl+Fuchs Zener Barriers are identified in terms of voltage, resistance and polarity, e. g., 10 V, 50 Ω, positive polarity.

These figures correspond to the zener voltage U_z and the total resistance of all barrier components. They therefore represent the safety values. The values stated on the type identification label correspond to the "worst case" data for U_z (U_o, V_{oc}) and I_k (I_o, I_{sc}) determined during certification; I_k is obtained by dividing U_z by the resistance R. It should be noted once again, however, that these values do not correspond to the operating range of the Zener Barrier.

Ideally, zener diodes would not allow any current in the reverse direction until the zener voltage has been attained.

In practice, zener diodes do allow a small leakage current, the value of which increases as the applied voltage is increased.

The operating range of a Zener Barrier must therefore be such that it is below the zener voltage, so that the leakage current is restricted to a minimum. Zener Barriers are normally tested to ensure that at the prescribed voltage the leakage current is smaller than 2 µA.

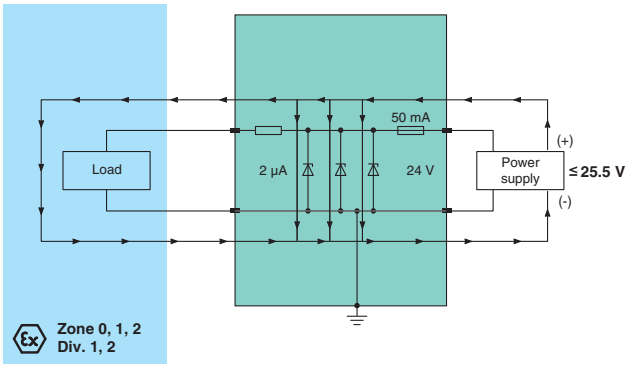


Figure 5 Leakage current through the zener diodes

Figure 5 shows the flow of leakage current through the zener diodes under normal circumstances. The Zener Barrier conducts a maximum of 2 µA leakage current so long as the supply voltage is less than 25.5 V. This is normal and has very little effect on the load. If the voltage exceeds 25.5 V, the zener diodes start to conduct more current. This can have an effect on the operating current and the accuracy. It is recommended that a regulated voltage source be used, which maintains the voltage under the value at which the diodes will start to conduct (a 24 V, 300 Ω barrier is represented here as an example).

These voltages are stated in the data sheet for a given barrier, together with the leakage current. If the leakage current for a given voltage differs from 2 µA, this is specifically stated.

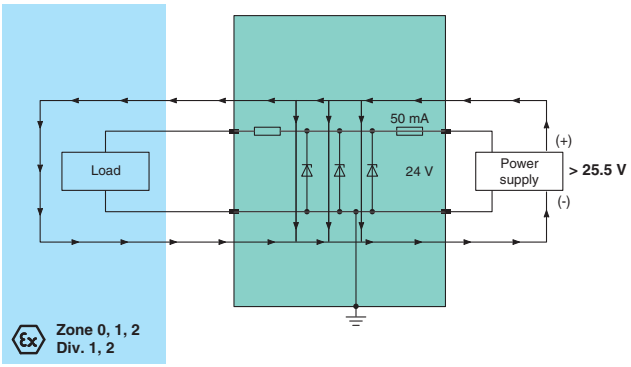


Figure 6 Total current drains through the zener diodes

Figure 6 shows that if the maximum permissible input (supply) voltage is exceeded, the total current drains through the zener diodes, without reaching the hazardous area.

Pepperl+Fuchs Zener Barriers have a low series resistance, given by the sum of the resistance R and the resistance value of the fuse F (see Figure 4). Due to the low series resistance, an inadvertent short-circuiting of terminals 13 and 23 can cause the fuse to open.

If the Zener Barriers are provided with a resistance, this limits the short-circuit current to a safe value in the event of a short circuit of the connecting wiring in the hazardous area or a connection to earth of the wiring attached to terminal 23.

Some barriers are available with a resistance connected between the output terminals. These are used in 4 mA to 20 mA transmitter circuits. The resistance converts the current in the intrinsically safe circuit into a voltage that can be measured in the safe area.

Pepperl+Fuchs Zener Barriers can be used in many applications. In the simplest case, a single channel barrier with a ground connection is used.

But in many applications it is not desirable that the intrinsically safe circuit is connected directly to ground. If the circuit in the safe area is grounded, under some circumstances grounding of the intrinsically safe circuit can lead to faults within the system. In this case, quasi-ground-free intrinsically safe circuits can be constructed with two or more Zener Barrier channels. Pepperl+Fuchs offers 2- and 3-channel barriers in the same housing as the single channel barriers.

Double grounding of intrinsically safe circuits is not permitted. The insulation voltage of the wiring and field devices, measured with respect to ground, must be greater than 500 V AC. The permissible ambient temperature of the Zener Barriers is between -20 °C to 60 °C (-4 °F to 140 °F).

Edition 908837 (US) / 208599 (EU) 11/2010

Grounding of Zener Barriers

Intrinsically safe circuits with Zener Barriers without galvanic isolation must be grounded. The cross-section of the ground connection, using a copper conductor, must be at least 4 mm^2 (12 AWG) (for further details see NEC 504-50 and EN 60079-14). The maintenance of these requirements prevents the occurrence of a dangerous potential with respect to ground.

A fault of the type illustrated in Figure 7 can cause a dangerous spark if the Zener Barrier is not grounded. If a fault occurs (see Figure 8), the zener diodes conducts and the current is shunted to ground. The fuse opens.

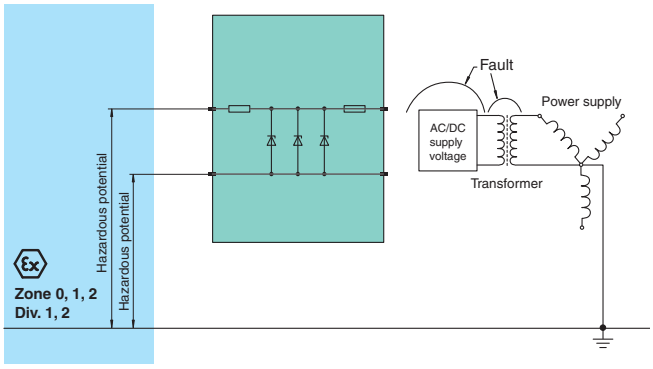


Figure 7 Non-grounded Zener Barrier

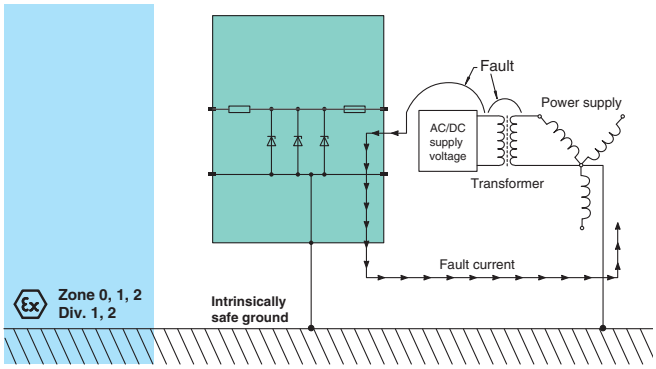


Figure 8 Grounded Zener Barriers

The system must have its own independent ground conductor, through which no supply system current flows.

Grounding with SB-System

The SB-system Termination Boards provide a common grounding point by utilizing its internal backplane and bringing the earth ground to a single terminating point on the board. The Termination Board is not required to be isolated from the backplane of the enclosure.

Multi-channel barriers

Analog circuits are often connected to two-channel barriers (see Figure 10). Since there is no grounding on this type of circuit, the system is a quasi-floating one. It is termed "quasi-floating", because it is "one zener voltage" above the ground potential. Although it does not actually float, the signal-to-noise ratio is improved.

A further advantage of multi-channel Zener Barriers is that a higher packing density can be achieved.

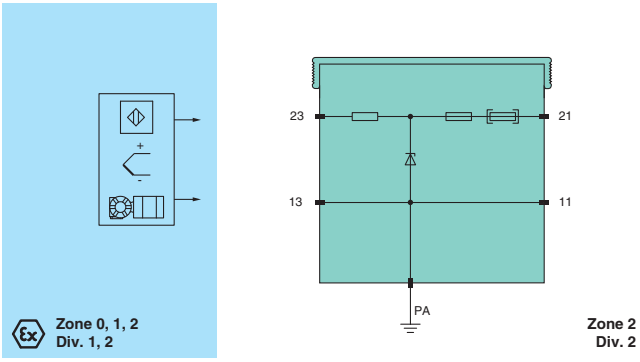


Figure 9 Single-channel Zener Barrier

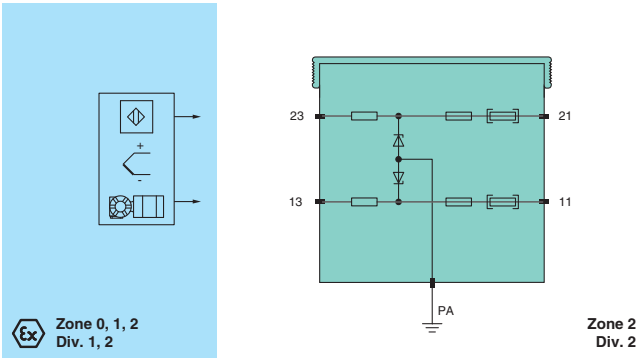


Figure 10 Two-channel Zener Barrier

SB-System specifications

The following are typical data used in the description of a barrier.

Working voltage at 2 µA

The maximum voltage that can be applied between the contacts in the safe area and ground at a defined leakage current. This is the upper value of the recommended operating range.

Maximum series resistance (Ω)

This is the maximum resistance that can be measured between the two end terminals of a barrier channel. It is obtained from the sum of any resistors and the resistance value of the fuse at an ambient temperature of 20 °C (68 °F).

Edition 908837 (US) / 208599 (EU) 11/2010

Fuse rating (mA)

The function of the fuse is to create an open circuit in the event of a power supply fault. It also protects the zener diodes from damage in the event of an abnormal operating condition.

Polarity

Zener Barriers are available in various versions. On Zener Barriers for positive polarity the anodes of the zener diodes are grounded. On barriers for negative polarity the cathodes are grounded. On barriers for alternating polarity (AC), interconnected zener diodes are employed and one side is grounded. These barriers can be used for both alternating voltage signals and direct voltage signals.

Safety information

The corresponding data sheets, the Declaration of Conformity, the EC-Type Examination Certificate and applicable certificates (see data sheet) are an integral part of this document.

Intended use

Laws and regulations applicable to the usage or planned purpose of usage must be observed. Devices are only approved for proper usage in accordance with intended use. Improper handling will result in voiding of any warrantee or manufacturer's responsibility.

Devices that have intrinsically safe control circuits are used to operate field devices within hazardous areas.

Zener Barriers are not suitable for the isolation of signals in power engineering unless specified in the respective data sheet.

Protection of operating personnel and the system is not ensured if the product is not used in accordance with its intended use.

Intrinsic safety circuits that were operated with circuits of other types of protection may not be used as intrinsically safe circuits afterwards.

Installation and commissioning

Commissioning and installation must by carried out by specially trained qualified personnel only.

Installation of the interface devices in the safe area

The devices are constructed to satisfy the IP20 protection classification and must be protected accordingly from adverse environmental conditions such as water spray or dirt exceeding the pollution degree 2.

The devices must be installed outside the hazardous area!

Depending on the level of protection, the intrinsically safe circuits of the devices (light blue identification on the device) can be located in the hazardous area. It is especially important to ensure that the intrinsically safe circuits are safely separated from all non-intrinsically safe circuits.

The installation of the intrinsically safe circuits is to be conducted in accordance with the relevant installation regulations.

The respective peak values of the field device and the associated device with regard to explosion protection should be considered when connecting intrinsically safe field devices with the intrinsically safe circuits of Zener Barriers (demonstration of intrinsic safety). EN 60079-14/ IEC 60079-14 or NEC and CEC electrical codes for US and Canada respectively must be observed (where appropriate). If available, also the product certification control drawing must be observed.

If more channels of one device are to be connected in parallel, it must be ensured that the parallel connection is made directly at the terminals. For the demonstration of intrinsic safety, the maximum values of the parallel connection are to be regarded.

The EC-Type Examination Certificates or standard certificates/approvals should be observed. It is especially important to observe the "special conditions" if these are included in the certificates.

Installation and commissioning of the interface devices within Zone 2/Div. 2 of the hazardous area

Only devices with the corresponding manufacturer's Declaration of Conformity or separate certificate of conformity can be installed in Zone 2/Div. 2.

The individual data sheets indicate whether these conditions are met.

For US and Canada installations, in Zone 2/Div. 2 follow the NEC and CEC wiring methods. The enclosure must be able to accept Zone 2/Div. 2 wiring methods. The referenced product certification control drawing must be observed.

For all other applications, the devices should be installed in a switch or junction box that:

- meets at least IP54 in accordance to EN 60529.
- meets the requirements of resistance to light and resistance to impact according to EN 60079-0/ IEC 60079-0.
- meets the requirements of thermal endurance according to EN 60079-15/IEC 60079-15.
- must not cause ignition danger by electrostatic charge during intended use, maintenance and cleaning.

Edition 908837 (US) / 208599 (EU) 11/2010

Depending on the level of protection, the intrinsically safe circuits of the devices (light blue identification on the device) can be located in the hazardous area. It is especially important to ensure that the intrinsically safe circuits are safely separated from all non-intrinsically safe circuits.

The installation of the intrinsically safe circuits is to be conducted in accordance with the relevant installation regulations.

The respective peak values of the field device and the associated device with regard to explosion protection should be considered when connecting intrinsically safe field devices with the intrinsically safe circuits of Zener Barriers (demonstration of intrinsic safety). EN 60079-14/ IEC 60079-14 or NEC and CEC electrical codes for US and Canada respectively must be observed (where appropriate). If available, also the product certification control drawing must be observed.

If more channels of one device are to be connected in parallel, it must be ensured that the parallel connection is made directly at the terminals. For the demonstration of intrinsic safety, the maximum values of the parallel connection are to be regarded.

The EC-Type Examination Certificates or standard certificates/approvals should be observed. It is especially important to observe the "special conditions" if these are included in the certificates.

Repair and maintenance

The transfer characteristics of the devices remain stable over long periods of time. This eliminates the need for regular adjustment. Maintenance is not required.

Fault elimination

No changes can be made to devices that are operated in hazardous areas. Repairs on the device are also not allowed.

Isolation coordinates for devices with Ex-certificate according to EN 50020 and EN 60079-11

The devices are assessed for pollution degree 2 and overvoltage category II according to EN 50178.

For additional details, see data sheets.

Technical data

Electrical data

Directive conformity

Directive 94/9/EC, associated standards see valid EC-Type Examination Certificates and/or EU statements of conformity or other appropriate certificates.

Please refer to data sheets.

Mechanical data

Mounting

Termination Board: snap-on 35 mm standard DIN rail acc. to EN 60715

Module: plug-in to Termination Board

Protection degree

IP20 acc. to EN 60529

Housing material

Polycarbonate (PC)

The devices are assessed for pollution degree 2 according to EN 50178.

Connection options

Self-opening terminals, max. core cross section 2 x 2.5 mm^2 (2 x 14 AWG)

The barriers are usually installed in racks or control cabinets.

They can be built into housings under production conditions, with the provision that the housing must allow for adequate protection. They can also be employed in hazardous areas, when it has been ascertained that the housing has been certified for this purpose.

The installation must be carried out in such a way that the intrinsic safety is not compromised by the following factors:

- Danger of mechanical damage
- Non-authorized changes or influence exerted by external personnel
- Humidity, dust or foreign bodies
- Ambient temperature exceeding the permissible level
- The connection of non-intrinsically safe circuits to intrinsically safe circuits

Grounding of the mounting rail is of the normal type, i. e. where both ends are connected to the intrinsically safe ground. This also simplifies checking the grounding.

Many installations provide the option of subsequent expansion.

Ambient conditions

Ambient temperature

-20 °C to 60 °C (-4 °F to 140 °F)

Storage temperature

-40 °C to 80 °C (-40 °F to 176 °F)

Relative humidity

max. 95 % without moisture condensation

Terminal designations

For additional details, see data sheets.

Edition 908837 (US) / 208599 (EU) 11/2010

DC Versions, positive polarity

Model Number	Channels	Electrical Data: Working Voltage at 2 µA (V)	Electrical Data: Max. Series Resistance (Ω)	Electrical Data: Fuse Rating (mA)	Features: Asymmetrical Version	Features: Replaceable Fuse	Features: LED	Page
SB0017	2	3	579	125		■		467
SB0018	1	7	119.5	80		■		464
SB0020	2	12	109	63		■		467
SB0027	1	15	597	50		■		464
SB0030	2	5	112	125		■		467
SB0031	2	6	600.5	80		■		467
SB0035	2	5	1021.5	100		■		467
SB0040	2	5	54	125		■		467
SB0041	2	7	2039	80		■		467
SB0042	2	5	213	125		■		467
SB0043	1	8	70.5	125		■		464
SB0613	1	6	36	80		■		464
SB0614	1	6	103	80		■		464
SB0710	1	6	105	32		■		464
SB0715	1	12	161	80		■	■	465
SB0722	1	18	212.5	32		■		464
SB0728	1	24	353.5	32		■	■	465
SB0764	2	10	1046	32		■		467
SB0767	2	12	178.5	63		■	■	468
SB0768	2	19	221	32		■		467
SB0779	2	24	353.5	32		■	■	468
SB0788	2	ch 1: 6 ch 2: 24	ch. 1: 112 ch. 2: 354	32	■	■	■	468
SB0796	2	ch 1: 23 ch 2: 17	ch. 1: 366.5 ch. 2: 462.5	32	■	■		467
SB1206	1	12	300.5	63		■		464
SB1250	1	12	59.5	80		■		464
SB1350	2	10	ch. 1: 91.5 ch. 2: 498.5	80	■	■		467
SB1351	2	10	498.5	80		■		467
SB2420	1	24	177.5	32		■	■	465
SB2424	1	24	1250.5	32		■		464
SB3250	2	12	63.5	63		■	■	468
SB3710	1	8	49	125		■		464
SB3715	1	12	71.5	80		■	■	465
SB3722	1	18	136	50		■		464

Edition 908837 (US) / 208599 (EU) 11/2010

Model Number	Channels	Electrical Data			Features			Page
		Working Voltage at 2 µA (V)	Max. Series Resistance (Ω)	Fuse Rating (mA)	Asymmetrical Version	Replaceable Fuse	LED	
SB3728	1	24	282	32		■	■	465
SB3729	1	24	214	32		■	■	465
SB4410	2	24	233.5	32		■	■	468
SB4420	2	24	177.5	32		■	■	468

DC Versions, negative polarity

Model Number	Channels	Electrical Data			Features			Page
		Working Voltage at 2 µA (V)	Max. Series Resistance (Ω)	Fuse Rating (mA)	Asymmetrical Version	Replaceable Fuse	LED	
SB1613	1	6	36	80		■		472
SB1710	1	6	105	32		■		472
SB1715	1	12	161	80		■	■	473
SB1728	1	24	353.5	32		■	■	473
SB1767	2	12	178	63		■	■	474
SB2206	1	12	300.5	63		■		472
SB2250	1	12	59.5	80		■		472
SB3420	1	24	177.5	32		■	■	473
SB4250	2	12	63.5	63		■	■	474
SB4710	1	8	49	125		■		472
SB4715	1	12	71.5	80		■	■	473
SB4722	1	18	136	50		■		472
SB5410	2	24	221	63		■	■	474
SB5420	2	24	165.5	63		■	■	474

Edition 908837 (US) / 208599 (EU) 11/2010

Pepperl+Fuchs Group
www.pepperl-fuchs.com
USA: +1 330 486 0002
pa-info@us.pepperl-fuchs.com
Germany: +49 621 776 2222
pa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091
pa-info@sg.pepperl-fuchs.com

DC Versions, floating

Model Number	Channels	Electrical Data: Working Voltage at 2 µA (V)	Electrical Data: Max. Series Resistance (Ω)	Electrical Data: Fuse Rating (mA)	Features: Replaceable Fuse	Features: Floating	Page
SB0021	2	7/-7	67.5	63	■	■	475
SB0023	2	7/-7	456	63	■	■	475
SB0033	2	5/-5	43	80	■	■	475
SB0601	2	3/-3	48	100	■	■	475
SB1301	2	6/-6	42	80	■	■	475
SB1302	2	9/-9	604	32	■	■	475
SB1303	2	12/-12	100	32	■	■	475
SB2401	2	12/-12	312	32	■	■	475

DC Versions with Diode Return

Model Number	Channels	Electrical Data: Working Voltage at 2 µA (V)	Electrical Data: Max. Series Resistance (Ω)	Electrical Data: Fuse Rating (mA)	Features: Asymmetrical Version	Features: Replaceable Fuse	Features: Diode Return	Features: LED	Page
SB0019	2	12	ch. 1: 32.5 + 1.2 V ch. 2: 207	63	■	■	■		470
SB0786	2	24	58.5 + 1.2 V	32		■	■		471
SB1502	1	12	41 + 1.2 V	32		■	■		466
SB1787	2	24	ch. 1: 58 + 1.2 V ch. 2: 353.5	32	■	■	■	■	469
SB2427	2	24	ch. 1: 48.5 + 1.2 V ch. 2: 305.5	32	■	■	■	■	469
SB2787	2	24	ch. 1: 48.5 + 1.2 V ch. 2: 282	32	■	■	■	■	469

Edition 908837 (US) / 208599 (EU) 11/2010

AC Versions

Model Number	Channels	Electrical Data			Features			Page
		Working Voltage at 2 µA (V)	Max. Series Resistance (Ω)	Fuse Rating (mA)	Increased Nominal Resistance	Replaceable Fuse	Star Connection	
SB0014	2	6.5	1776.5	80		■		477
SB0015	2	5	75	100		■		477
SB0016	2	6	106	80		■		477
SB0022	2	2.5	804	125		■		477
SB0024	1	12	181.5	63		■		476
SB0026	1	1	39	125		■		476
SB0028	1	15	110	63		■		476
SB0029	1	15	234	63		■		476
SB0036	2	5	3400	32	■	■	■	478
SB0037	1	6	179	80		■		476
SB0044	2	8.5	174.5	63		■		477
SB0045	2	8.5	1029.5	63		■		477
SB0201	2	2	40	125		■		477
SB0305	2	1.25	405	125		■		477
SB0751	2	2	14.1	125		■		477
SB0760	2	6	112	32		■	■	478
SB0761	2	6	149	80		■		477
SB0765	2	12	167.5	32		■	■	478
SB0766	2	10	208	32		■		477
SB0772	2	18	383.5	32		■	■	478
SB0778	2	24	709	32		■	■	478
SB1203	1	18	495	32		■		476
SB1602	1	12	71.5	63		■		476
SB1761	2	7	405	32		■		477
SB1766	2	9.8	110	32		■		477
SB2710	1	6	105	32		■		476
SB2764	2	10	1096	32		■		477

Edition 908837 (US) / 208599 (EU) 11/2010

Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0002 pa-info@us.pepperl-fuchs.com
Germany: +49 621 776 2222 pa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 pa-info@sg.pepperl-fuchs.com

Power Supply

Model Number	Channels	Electrical Data		Features			Page
		Max. Series Resistance (Ω)	Fuse Rating (mA)	Replaceable Fuse	Output Voltage 12 V DC	Input Voltage 24 V DC	
SB0604	1	107	50	■	■	■	479

Accessories

Model Number	Description	Page
SB9100	Termination Board for 10 SB Zener Barriers	484
SB9101	Terminal Base for 1 SB Zener Barrier	484
SB9106	Termination Board for 6 SB Zener Barriers	484
SB9220	Grounding Rail for 20 SB Zener Barriers	484
SB9221	Grounding Rail for 10 SB Zener Barriers	484
SB9222	Grounding Rail for 6 SB Zener Barriers	484

Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **1-channel**
- **DC version, positive polarity**
- **Terminal Base or Termination Board mounting, pluggable**
- **Replaceable fuse**

Function

The SB-System Zener Barriers provide protection for electrical signals within hazardous areas.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

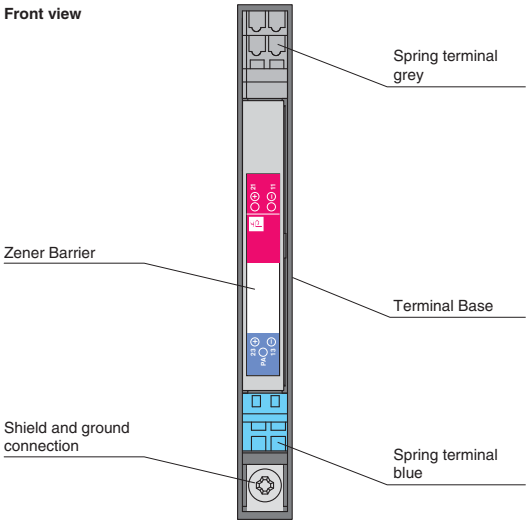
Additionally this Zener Barrier is equipped with a replaceable back-up fuse.

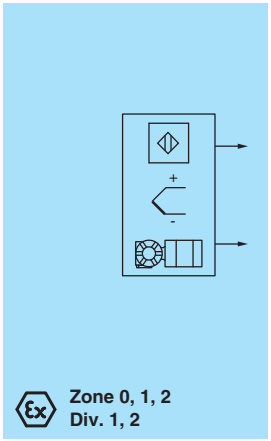
Zener Barriers will be supplied without Terminal Base or Termination Board. Please order separately.

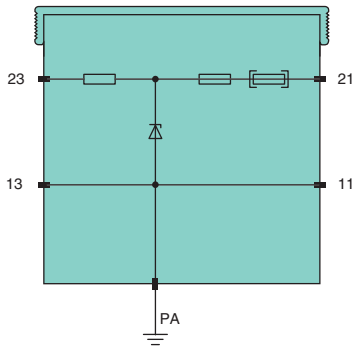
Technical data

Model number	Working voltage at 2 µA (V)	Max. series resistance (Ω) without back-up fuse/with back-up fuse	Fuse rating (mA) internal fuse/back-up fuse
SB0018	7	111/119.5	80/80
SB0027	15	581/597	50/50
SB0043	8	66.5/70.5	125/125
SB0613	6	29/36	100/80
SB0614	6	96/103	100/80
SB0710	6	85.5/105	50/32
SB0722	18	192.5/212.5	50/32
SB1206	12	290/300.5	63/63
SB1250	12	51.5/59.5	80/80
SB2424	24	1230.5/1250.5	32/32
SB3710	8	45/49	125/125
SB3722	18	120/136	50/50
Hazardous area connection			
Connection	terminals 13, 23		
Safe area connection			
Connection	terminals 11, 21		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		
Mechanical specifications			
Protection degree	IP20 (installed on Terminal Base or Termination Board)		
Connection	wiring via Terminal Base or Termination Board		
Mass	approx. 70 g		
Dimensions	9.7 x 70.4 x 68.2 mm (0.4 x 2.8 x 2.7 in)		
Mounting	Terminal Base or Termination Board mounting on 35 mm DIN rail acc. to DIN EN 60715		
Data for application in conjunction with hazardous areas	see page 480 for entity parameters		
EC-Type Examination Certificate	TÜV 99 ATEX 1449 X		
Group, category, type of protection	Ⓔx II (1)G [Ex ia] IIC Ⓔx II (1)D [Ex iaD]		
UL approval			
Control drawing	16-557UL-12 (cULus)		

Diagrams







Edition 908837 (US) / 208599 (EU) 11/2010

Technical data

Model number	Working voltage at 2 µA (V)	Max. series resistance (Ω) without back-up fuse/with back-up fuse	Fuse rating (mA) internal fuse/back-up fuse
SB0715	12	153/161	80/80
SB0728	24	334/353.5	50/32
SB2420	24	157.5/177.5	32/32
SB3715	12	63/71.5	100/80
SB3728	24	262/282	50/32
SB3729	24	194/214	32/32
Hazardous area connection			
Connection	terminals 13, 23		
Safe area connection			
Connection	terminals 11, 21, 22		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		
Mechanical specifications			
Protection degree	IP20 (installed on Terminal Base or Termination Board)		
Connection	wiring via Terminal Base or Termination Board		
Mass	approx. 70 g		
Dimensions	9.7 x 70.4 x 68.2 mm (0.4 x 2.8 x 2.7 in)		
Mounting	Terminal Base or Termination Board mounting on 35 mm DIN rail acc. to DIN EN 60715		
Data for application in conjunction with hazardous areas	see page 480 for entity parameters		
EC-Type Examination Certificate	TÜV 99 ATEX 1449 X		
Group, category, type of protection	⟨Ex⟩ II (1)G [Ex ia] IIC ⟨Ex⟩ II (1)D [Ex iaD]		
UL approval			
Control drawing	16-557UL-12 (cULus)		

Features

- **1-channel**
- **DC version, positive polarity**
- **Terminal Base or Termination Board mounting, pluggable**
- **Replaceable fuse**
- **With LED**

Function

The SB-System Zener Barriers provide protection for electrical signals within hazardous areas.

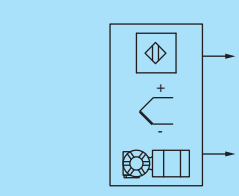
The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

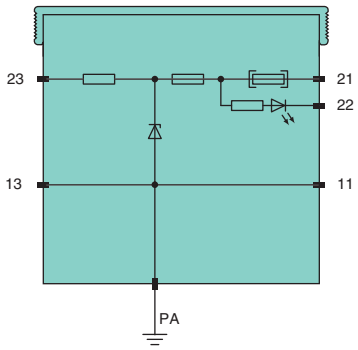
Additionally this Zener Barrier is equipped with a replaceable back-up fuse.

Zener Barriers will be supplied without Terminal Base or Termination Board. Please order separately.

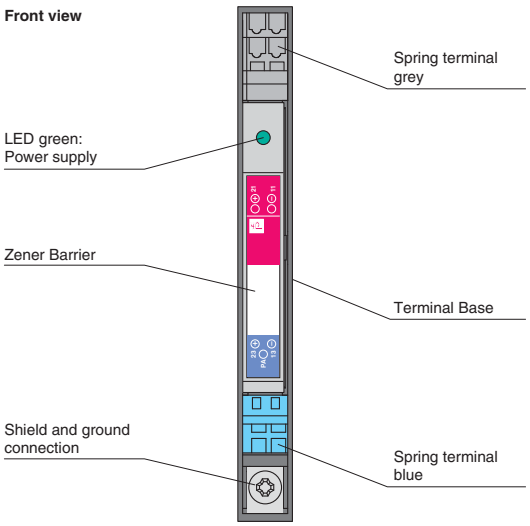
Diagrams



⟨Ex⟩ **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2



Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **1-channel**
- **DC version, positive polarity**
- **Terminal Base or Termination Board mounting, pluggable**
- **Replaceable fuse**
- **With diode return**

Function

The SB-System Zener Barriers provide protection for electrical signals within hazardous areas.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

Additionally this Zener Barrier is equipped with a replaceable back-up fuse.

The Zener Barrier is for evaluation of signals from the hazardous area. The diodes of diode return prevent a current into the hazardous area, therefore the current assumption for intrinsic safety calculations is zero.

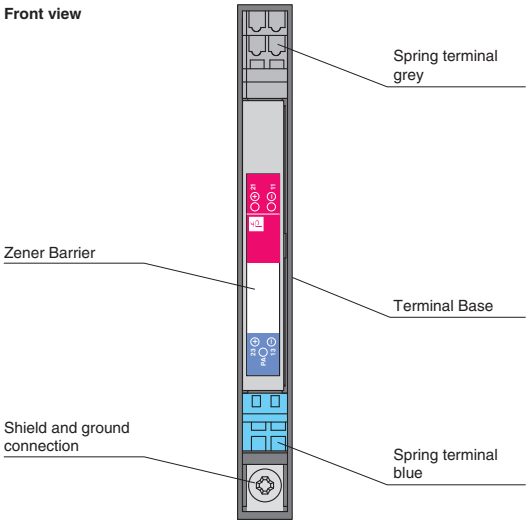
Zener Barriers will be supplied without Terminal Base or Termination Board. Please order separately.

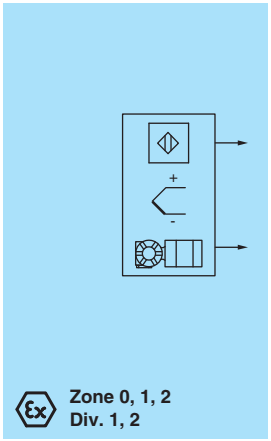
Technical data

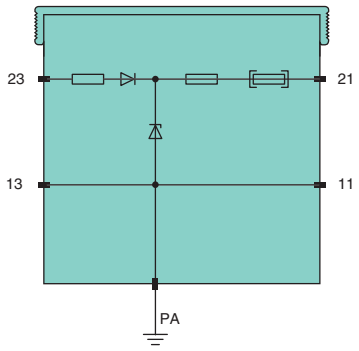
Model number	Working voltage at 2 µA (V)	Max. series resistance (Ω) without back-up fuse/with back-up fuse	Fuse rating (mA) internal fuse/back-up fuse
SB1502	12	21/41 Ω + 1.2 V	50/32
Hazardous area connection			
Connection	terminals 13, 23		
Safe area connection			
Connection	terminals 11, 21		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		
Mechanical specifications			
Protection degree	IP20 (installed on Terminal Base or Termination Board)		
Connection	wiring via Terminal Base or Termination Board		
Mass	approx. 70 g		
Dimensions	9.7 x 70.4 x 68.2 mm (0.4 x 2.8 x 2.7 in)		
Mounting	Terminal Base or Termination Board mounting on 35 mm DIN rail acc. to DIN EN 60715		
Data for application in conjunction with hazardous areas	see page 480 for entity parameters		
EC-Type Examination Certificate	TÜV 99 ATEX 1449 X		
Group, category, type of protection	⟨Ex⟩ II (1)G [Ex ia] IIC ⟨Ex⟩ II (1)D [Ex iaD]		
UL approval			
Control drawing	16-557UL-12 (cULus)		

Diagrams

Front view







Edition 908837 (US) / 208599 (EU) 11/2010

Technical data

Model number	Working voltage at 2 µA (V)	Max. series resistance (Ω) without back-up fuse/with back-up fuse	Fuse rating (mA) internal fuse/back-up fuse
SB0017	3	574.5/579	125/125
SB0020	12	98/109	63/63
SB0030	5	108/112	125/125
SB0031	6	592/600.5	80/80
SB0035	5	1017/1021.5	125/100
SB0040	5	50/54	160/125
SB0041	7	2030.5/2039	80/80
SB0042	5	209/213	125/125
SB0764	10	1026.5/1046	50/32
SB0768	19	201/221	32/32
SB0796	23/17	ch. 1: 346.5/366.5 ch. 2: 442.5/462.5	32/32
SB1350	10	ch. 1: 83/91.5 ch. 2: 490/498.5	80/80
SB1351	10	490/498.5	80/80
Hazardous area connection			
Connection	terminals 13; 23		
Safe area connection			
Connection	terminals 11; 21		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		
Mechanical specifications			
Protection degree	IP20 (installed on Terminal Base or Termination Board)		
Connection	wiring via Terminal Base or Termination Board		
Mass	approx. 70 g		
Dimensions	9.7 x 70.4 x 68.2 mm (0.4 x 2.8 x 2.7 in)		
Mounting	Terminal Base or Termination Board mounting on 35 mm DIN rail acc. to DIN EN 60715		
Data for application in conjunction with hazardous areas	see page 480 for entity parameters		
EC-Type Examination Certificate	TÜV 99 ATEX 1449 X		
Group, category, type of protection	II (1)G [Ex ia] IIC II (1)D [Ex iaD]		
UL approval			
Control drawing	16-557UL-12 (cULus)		

Features

- **2-channel**
- **DC version, positive polarity**
- **Terminal Base or Termination Board mounting, pluggable**
- **Replaceable fuse**
- **Asymmetrical version (SB0796, SB1350)**

Function

The SB-System Zener Barriers provide protection for electrical signals within hazardous areas.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

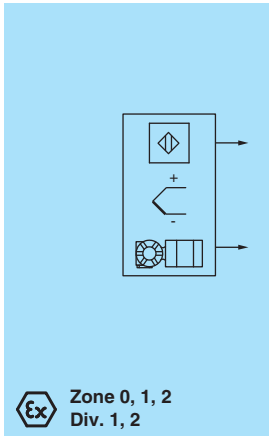
The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

Additionally this Zener Barrier is equipped with a replaceable back-up fuse.

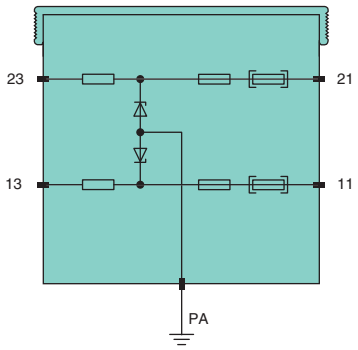
Depending on the application, increased or decreased intrinsic safety parameters apply for serial or parallel connection. For the detailed parameters refer to the Zener Barrier certificate. Application examples can be found in the system description of the Zener Barriers.

Zener Barriers will be supplied without Terminal Base or Termination Board. Please order separately.

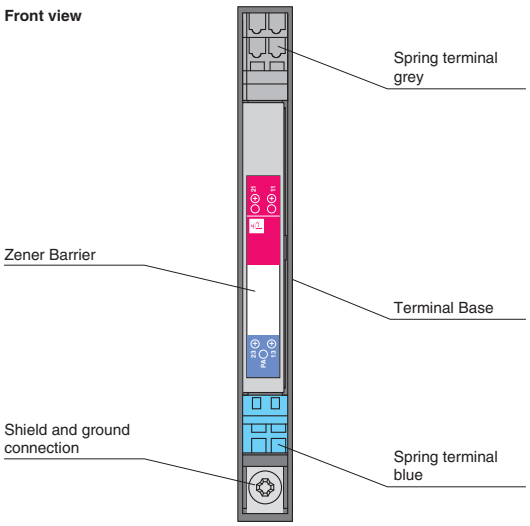
Diagrams



Zone 0, 1, 2
Div. 1, 2



Zone 2
Div. 2



Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **2-channel**
- **DC version, positive polarity**
- **Terminal Base or Termination Board mounting, pluggable**
- **Replaceable fuse**
- **Asymmetrical version (SB0788)**
- **With LED**

Function

The SB-System Zener Barriers provide protection for electrical signals within hazardous areas.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

Additionally this Zener Barrier is equipped with a replaceable back-up fuse.

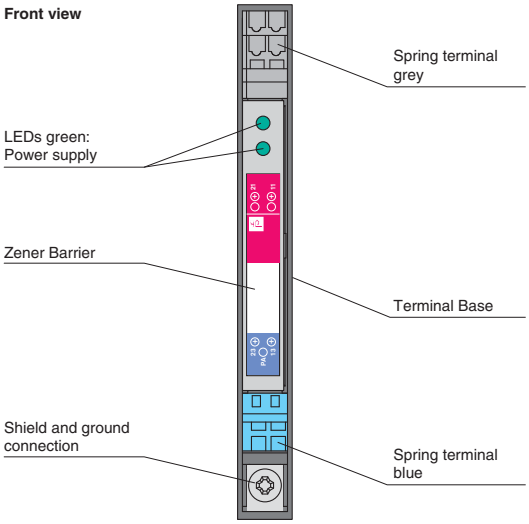
Depending on the application, increased or decreased intrinsic safety parameters apply for serial or parallel connection. For the detailed parameters refer to the Zener Barrier certificate. Application examples can be found in the system description of the Zener Barriers.

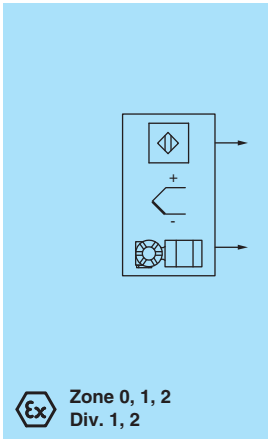
Zener Barriers will be supplied without Terminal Base or Termination Board. Please order separately.

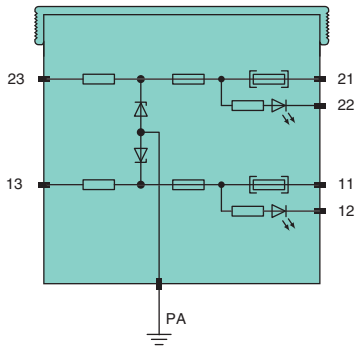
Technical data

Model number	Working voltage at 2 µA (V)	Max. series resistance (Ω) without back-up fuse/with back-up fuse	Fuse rating (mA) internal fuse/back-up fuse
SB0767	12	167.5/178.5	63/63
SB0779	24	334/353.5	50/32
SB0788	6/24	ch. 1: 92.5/112 ch. 2: 334.5/354	32/32
SB3250	12	52.5/63.5	63/63
SB4410	24	213.5/233.5	32/32
SB4420	24	157.5/177.5	32/32
Hazardous area connection			
Connection	terminals 13; 23		
Safe area connection			
Connection	terminals 11, 12; 21, 22		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		
Mechanical specifications			
Protection degree	IP20 (installed on Terminal Base or Termination Board)		
Connection	wiring via Terminal Base or Termination Board		
Mass	approx. 70 g		
Dimensions	9.7 x 70.4 x 68.2 mm (0.4 x 2.8 x 2.7 in)		
Mounting	Terminal Base or Termination Board mounting on 35 mm DIN rail acc. to DIN EN 60715		
Data for application in conjunction with hazardous areas	see page 480 for entity parameters		
EC-Type Examination Certificate	TÜV 99 ATEX 1449 X		
Group, category, type of protection	Ex II (1)G [Ex ia] IIC Ex II (1)D [Ex iaD]		
UL approval			
Control drawing	16-557UL-12 (cULus)		

Diagrams







Edition 908837 (US) / 208599 (EU) 11/2010

Technical data

Model number	Working voltage at 2 µA (V)	Max. series resistance (Ω) without back-up fuse/with back-up fuse	Fuse rating (mA) internal fuse/back-up fuse
SB1787	24	ch. 1: 38.5/ 58 + 1.2 V ch. 2: 334/353.5	32/32
SB2427	24	ch. 1: 28.5/ 48.5 + 1.2 V ch. 2: 286/305.5	32/32
SB2787	24	ch. 1: 28.5/ 48.5 + 1.2 V ch. 2: 262/282	32/32
Hazardous area connection			
Connection	terminals 13; 23		
Safe area connection			
Connection	terminals 11, 12; 21		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		
Mechanical specifications			
Protection degree	IP20 (installed on Terminal Base or Termination Board)		
Connection	wiring via Terminal Base or Termination Board		
Mass	approx. 70 g		
Dimensions	9.7 x 70.4 x 68.2 mm (0.4 x 2.8 x 2.7 in)		
Mounting	Terminal Base or Termination Board mounting on 35 mm DIN rail acc. to DIN EN 60715		
Data for application in conjunction with hazardous areas	see page 480 for entity parameters		
EC-Type Examination Certificate	TÜV 99 ATEX 1449 X		
Group, category, type of protection	⟨Ex⟩ II (1)G [Ex ia] IIC ⟨Ex⟩ II (1)D [Ex iaD]		
UL approval			
Control drawing	16-557UL-12 (cULus)		

Features

- **2-channel**
- **DC version, positive polarity**
- **Terminal Base or Termination Board mounting, pluggable**
- **Replaceable fuse**
- **With diode return**
- **Asymmetrical version**
- **With LED**

Function

The SB-System Zener Barriers provide protection for electrical signals within hazardous areas.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

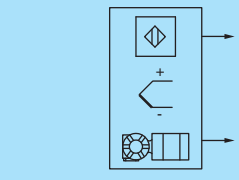
The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

Additionally this Zener Barrier is equipped with a replaceable back-up fuse.

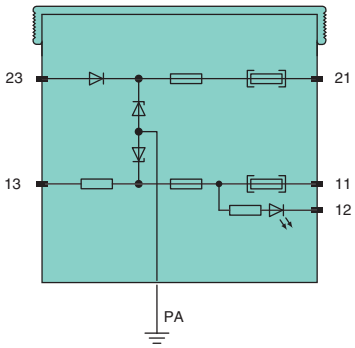
The Zener Barrier is for evaluation of signals from the hazardous area. The diodes of diode return prevent a current into the hazardous area, therefore the current assumption for intrinsic safety calculations is zero.

Zener Barriers will be supplied without Terminal Base or Termination Board. Please order separately.

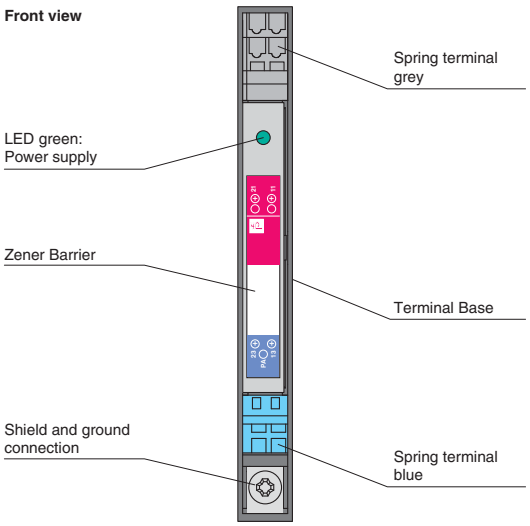
Diagrams



⟨Ex⟩ **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2



Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **2-channel**
- **DC version, positive polarity**
- **Terminal Base or Termination Board mounting, pluggable**
- **Replaceable fuse**
- **With diode return**
- **Asymmetrical version**

Function

The SB-System Zener Barriers provide protection for electrical signals within hazardous areas.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

Additionally this Zener Barrier is equipped with a replaceable back-up fuse.

The Zener Barrier is for evaluation of signals from the hazardous area. The diodes of diode return prevent a current into the hazardous area, therefore the current assumption for intrinsic safety calculations is zero.

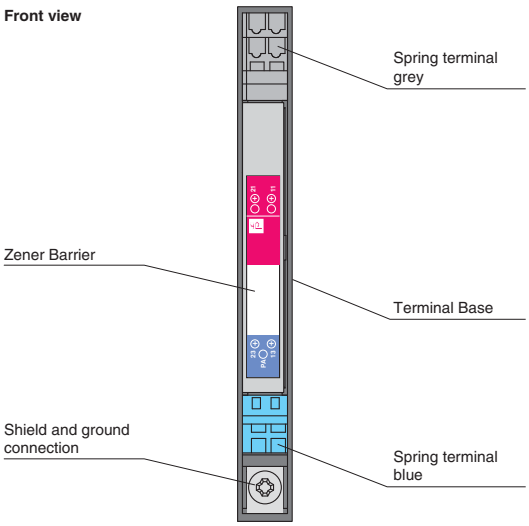
Zener Barriers will be supplied without Terminal Base or Termination Board. Please order separately.

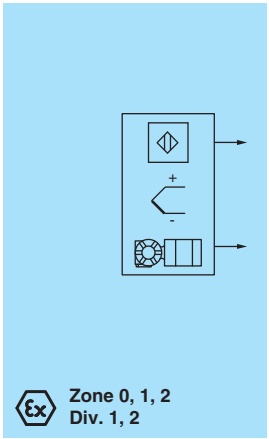
Technical data

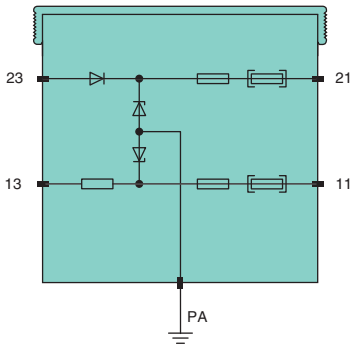
Model number	Working voltage at 2 µA (V)	Max. series resistance (Ω) without back-up fuse/with back-up fuse	Fuse rating (mA) internal fuse/back-up fuse
SB0019	12	ch. 1: 21.5/ 32.5 + 1.2 V ch. 2: 196/207	63/63
Hazardous area connection			
Connection	terminals 13; 23		
Safe area connection			
Connection	terminals 11; 21		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		
Mechanical specifications			
Protection degree	IP20 (installed on Terminal Base or Termination Board)		
Connection	wiring via Terminal Base or Termination Board		
Mass	approx. 70 g		
Dimensions	9.7 x 70.4 x 68.2 mm (0.4 x 2.8 x 2.7 in)		
Mounting	Terminal Base or Termination Board mounting on 35 mm DIN rail acc. to DIN EN 60715		
Data for application in conjunction with hazardous areas	see page 480 for entity parameters		
EC-Type Examination Certificate	TÜV 99 ATEX 1449 X		
Group, category, type of protection	⟨Ex⟩ II (1)G [Ex ia] IIC ⟨Ex⟩ II (1)D [Ex iaD]		
UL approval			
Control drawing	16-557UL-12 (cULus)		

Diagrams

Front view







Edition 908837 (US) / 208599 (EU) 11/2010

Technical data

Model number	Working voltage at 2 µA (V)	Max. series resistance (Ω) without back-up fuse/with back-up fuse	Fuse rating (mA) internal fuse/back-up fuse
SB0786	24	38.5/58.5 + 1.2 V	32/32
Hazardous area connection			
Connection	terminals 13; 23		
Safe area connection			
Connection	terminals 11; 21		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		
Mechanical specifications			
Protection degree	IP20 (installed on Terminal Base or Termination Board)		
Connection	wiring via Terminal Base or Termination Board		
Mass	approx. 70 g		
Dimensions	9.7 x 70.4 x 68.2 mm (0.4 x 2.8 x 2.7 in)		
Mounting	Terminal Base or Termination Board mounting on 35 mm DIN rail acc. to DIN EN 60715		
Data for application in conjunction with hazardous areas	see page 480 for entity parameters		
EC-Type Examination Certificate	TÜV 99 ATEX 1449 X		
Group, category, type of protection	⟨Ex⟩ II (1)G [Ex ia] IIC ⟨Ex⟩ II (1)D [Ex iaD]		
UL approval			
Control drawing	16-557UL-12 (cULus)		

Features

- **2-channel**
- **DC version, positive polarity**
- **Terminal Base or Termination Board mounting, pluggable**
- **Replaceable fuse**
- **With diode return**

Function

The SB-System Zener Barriers provide protection for electrical signals within hazardous areas.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

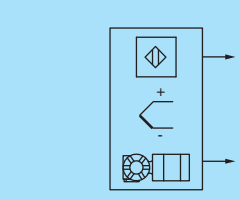
The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

Additionally this Zener Barrier is equipped with a replaceable back-up fuse.

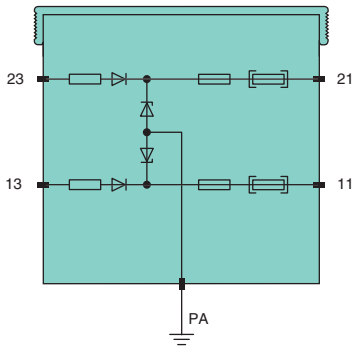
The Zener Barrier is for evaluation of signals from the hazardous area. The diodes of diode return prevent a current into the hazardous area, therefore the current assumption for intrinsic safety calculations is zero.

Zener Barriers will be supplied without Terminal Base or Termination Board. Please order separately.

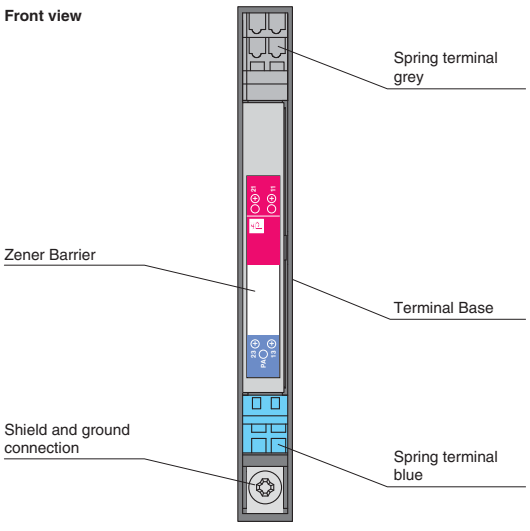
Diagrams



⟨Ex⟩ **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2



Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **1-channel**
- **DC version, negative polarity**
- **Terminal Base or Termination Board mounting, pluggable**
- **Replaceable fuse**

Function

The SB-System Zener Barriers provide protection for electrical signals within hazardous areas.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a negative polarity, i. e. the cathodes of the Zener diodes are grounded.

Additionally this Zener Barrier is equipped with a replaceable back-up fuse.

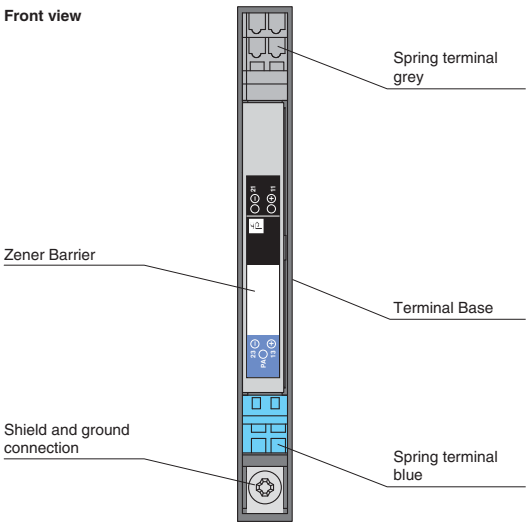
Zener Barriers will be supplied without Terminal Base or Termination Board. Please order separately.

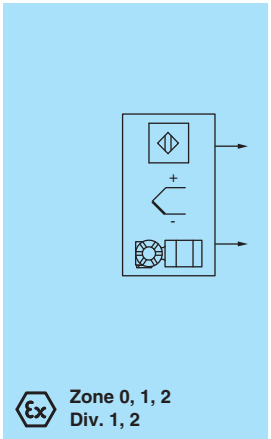
Technical data

Model number	Working voltage at 2 µA (V)	Max. series resistance (Ω) without back-up fuse/with back-up fuse	Fuse rating (mA) internal fuse/back-up fuse
SB1613	6	29/36	100/80
SB1710	6	85/105	50/32
SB2206	12	289.5/300.5	63/63
SB2250	12	51.5/59.5	80/80
SB4710	8	45/49	125/125
SB4722	18	120/136	50/50
Hazardous area connection			
Connection	terminals 13, 23		
Safe area connection			
Connection	terminals 11, 21		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		
Mechanical specifications			
Protection degree	IP20 (installed on Terminal Base or Termination Board)		
Connection	wiring via Terminal Base or Termination Board		
Mass	approx. 70 g		
Dimensions	9.7 x 70.4 x 68.2 mm (0.4 x 2.8 x 2.7 in)		
Mounting	Terminal Base or Termination Board mounting on 35 mm DIN rail acc. to DIN EN 60715		
Data for application in conjunction with hazardous areas	see page 480 for entity parameters		
EC-Type Examination Certificate	TÜV 99 ATEX 1449 X		
Group, category, type of protection	⟨Ex⟩ II (1)G [Ex ia] IIC ⟨Ex⟩ II (1)D [Ex iaD]		
UL approval			
Control drawing	16-557UL-12 (cULus)		

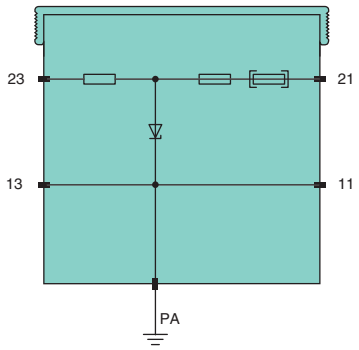
Diagrams

Front view





⟨Ex⟩ **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2

Edition 908837 (US) / 208599 (EU) 11/2010

Technical data

Model number	Working voltage at 2 µA (V)	Max. series resistance (Ω) without back-up fuse/with back-up fuse	Fuse rating (mA) internal fuse/back-up fuse
SB1715	12	152.5/161	80/80
SB1728	24	334/353.5	32/32
SB3420	24	157.5/177.5	32/32
SB4715	12	63/71.5	80/80
Hazardous area connection			
Connection	terminals 13, 23		
Safe area connection			
Connection	terminals 11, 21, 22		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		
Mechanical specifications			
Protection degree	IP20 (installed on Terminal Base or Termination Board)		
Connection	wiring via Terminal Base or Termination Board		
Mass	approx. 70 g		
Dimensions	9.7 x 70.4 x 68.2 mm (0.4 x 2.8 x 2.7 in)		
Mounting	Terminal Base or Termination Board mounting on 35 mm DIN rail acc. to DIN EN 60715		
Data for application in conjunction with hazardous areas	see page 480 for entity parameters		
EC-Type Examination Certificate	TÜV 99 ATEX 1449 X		
Group, category, type of protection	⟨Ex⟩ II (1)G [Ex ia] IIC ⟨Ex⟩ II (1)D [Ex iaD]		
UL approval			
Control drawing	16-557UL-12 (cULus)		

Features

- **1-channel**
- **DC version, negative polarity**
- **Terminal Base or Termination Board mounting, pluggable**
- **Replaceable fuse**
- **With LED**

Function

The SB-System Zener Barriers provide protection for electrical signals within hazardous areas.

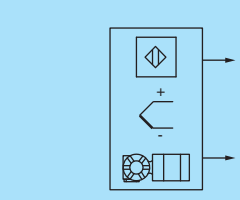
The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a negative polarity, i. e. the cathodes of the Zener diodes are grounded.

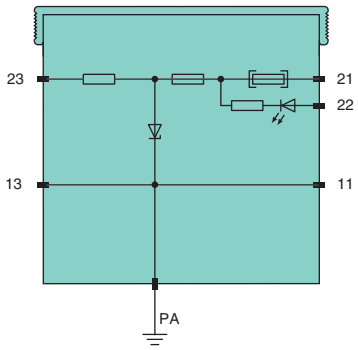
Additionally this Zener Barrier is equipped with a replaceable back-up fuse.

Zener Barriers will be supplied without Terminal Base or Termination Board. Please order separately.

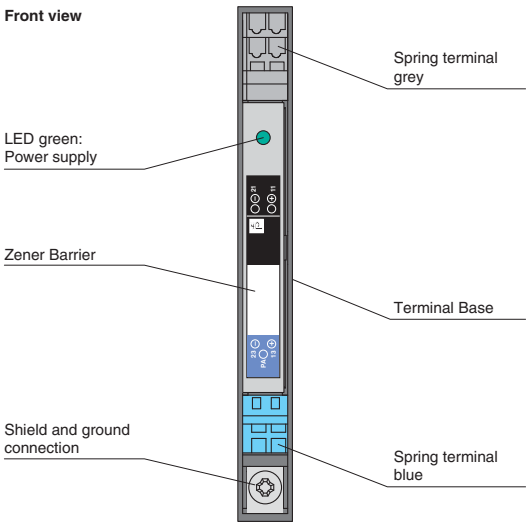
Diagrams



⟨Ex⟩ **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2



Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **2-channel**
- **DC version, negative polarity**
- **Terminal Base or Termination Board mounting, pluggable**
- **Replaceable fuse**
- **With LED**

Function

The SB-System Zener Barriers provide protection for electrical signals within hazardous areas.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a negative polarity, i. e. the cathodes of the Zener diodes are grounded.

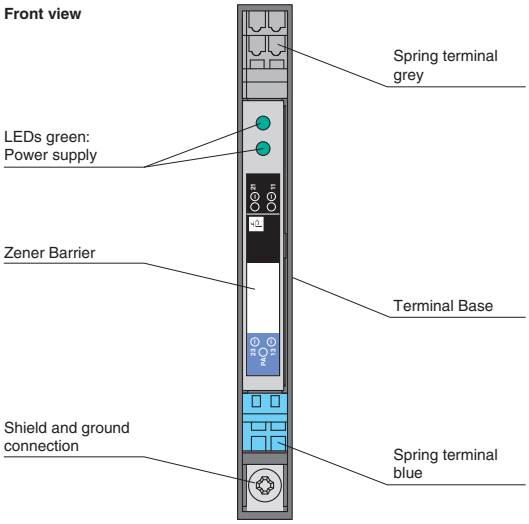
Additionally this Zener Barrier is equipped with a replaceable back-up fuse.

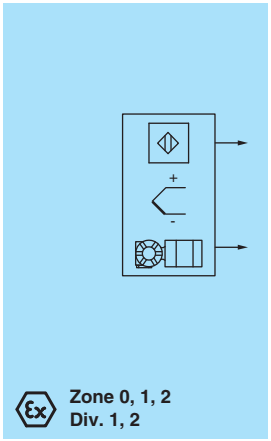
Zener Barriers will be supplied without Terminal Base or Termination Board. Please order separately.

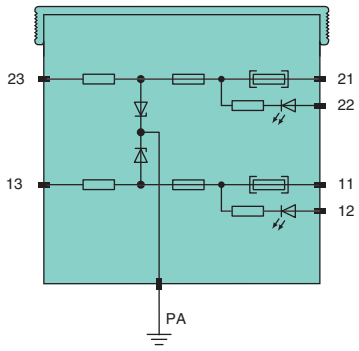
Technical data

Model number	Working voltage at 2 µA (V)	Max. series resistance (Ω) without back-up fuse/with back-up fuse	Fuse rating (mA) internal fuse/back-up fuse
SB1767	12	167/178	63/63
SB4250	12	52.5/63.5	63/63
SB5410	24	205/221	50/50
SB5420	24	149/165.5	50/50
Hazardous area connection			
Connection	terminals 13; 23		
Safe area connection			
Connection	terminals 11, 12; 21, 22 (11; 21 for SB1767)		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		
Mechanical specifications			
Protection degree	IP20 (installed on Terminal Base or Termination Board)		
Connection	wiring via Terminal Base or Termination Board		
Mass	approx. 70 g		
Dimensions	9.7 x 70.4 x 68.2 mm (0.4 x 2.8 x 2.7 in)		
Mounting	Terminal Base or Termination Board mounting on 35 mm DIN rail acc. to DIN EN 60715		
Data for application in conjunction with hazardous areas	see page 480 for entity parameters		
EC-Type Examination Certificate	TÜV 99 ATEX 1449 X		
Group, category, type of protection	⟨Ex⟩ II (1)G [Ex ia] IIC ⟨Ex⟩ II (1)D [Ex iaD]		
UL approval			
Control drawing	16-557UL-12 (cULus)		

Diagrams







Edition 908837 (US) / 208599 (EU) 11/2010

Technical data

Model number	Working voltage at 2 µA (V)	Max. series resistance (Ω) without back-up fuse/with back-up fuse	Fuse rating (mA) internal fuse/back-up fuse
SB0021	7/-7	58/67.5	80/63
SB0023	7/-7	446.5/456	80/63
SB0033	5/-5	36/43	100/80
SB0601	3/-3	43.5/48	125/100
SB1301	6/-6	34/42	80/80
SB1302	9/-9	584/604	50/32
SB1303	12/-12	80/100	50/32
SB2401	12/-12	292/312	32/32
Hazardous area connection			
Connection	terminals 13; 23		
Safe area connection			
Connection	terminals 11; 21		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		
Mechanical specifications			
Protection degree	IP20 (installed on Terminal Base or Termination Board)		
Connection	wiring via Terminal Base or Termination Board		
Mass	approx. 70 g		
Dimensions	9.7 x 70.4 x 68.2 mm (0.4 x 2.8 x 2.7 in)		
Mounting	Terminal Base or Termination Board mounting on 35 mm DIN rail acc. to DIN EN 60715		
Data for application in conjunction with hazardous areas	see page 480 for entity parameters		
EC-Type Examination Certificate	TÜV 99 ATEX 1449 X		
Group, category, type of protection	Ex II (1)G [Ex ia] IIC Ex II (1)D [Ex iaD]		
UL approval			
Control drawing	16-557UL-12 (cULus)		

Features

- **2-channel**
- **DC version, floating**
- **Terminal Base or Termination Board mounting, pluggable**
- **Replaceable fuse**

Function

The SB-System Zener Barriers provide protection for electrical signals within hazardous areas.

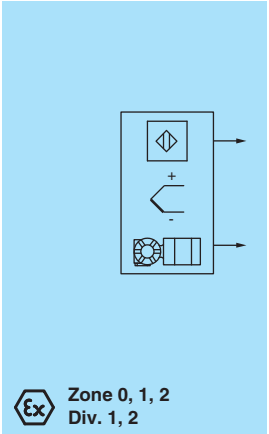
The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

This dual channel Zener Barrier has a negative and positive polarity channel.

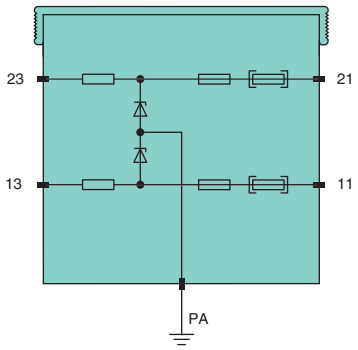
Additionally this Zener Barrier is equipped with a replaceable back-up fuse.

Zener Barriers will be supplied without Terminal Base or Termination Board. Please order separately.

Diagrams

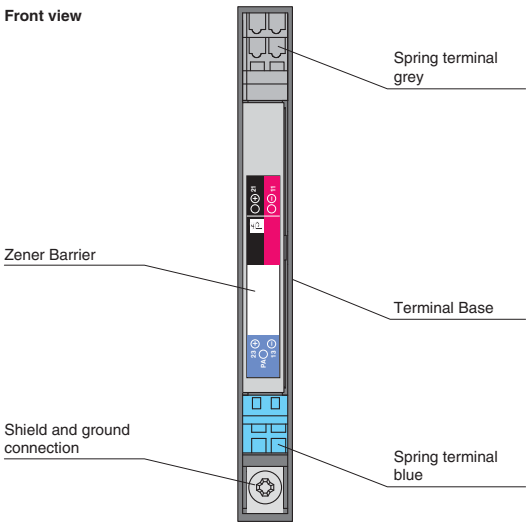


Ex **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2

Front view



Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **1-channel**
- **AC version**
- **Terminal Base or Termination Board mounting, pluggable**
- **Replaceable fuse**

Function

The SB-System Zener Barriers provide protection for electrical signals within hazardous areas.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has alternating polarities, i. e. interconnected Zener diodes are employed and one side is grounded. The Zener Barrier can be used for both alternating voltage signals and direct voltage signals.

Additionally this Zener Barrier is equipped with a replaceable back-up fuse.

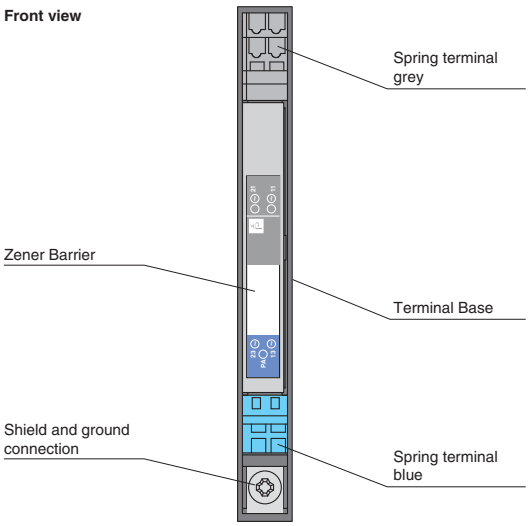
Zener Barriers will be supplied without Terminal Base or Termination Board. Please order separately.

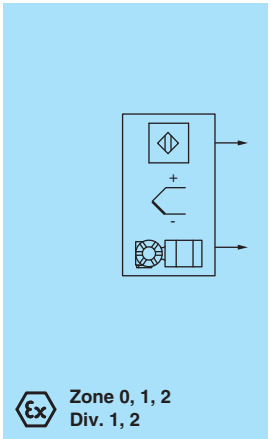
Technical data

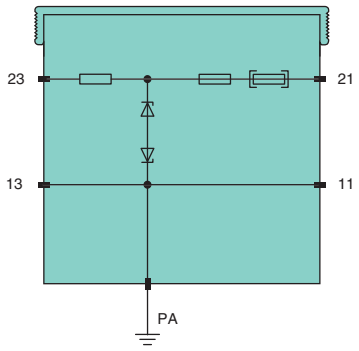
Model number	Working voltage at 2 µA (V)	Max. series resistance (Ω) without back-up fuse/with back-up fuse	Fuse rating (mA) internal fuse/back-up fuse
SB0024	12	170.5/181.5	63/63
SB0026	1	35.5/39	160/125
SB0028	15	99/110	63/63
SB0029	15	223/234	63/63
SB0037	6	171.5/179	100/80
SB1203	18	475/495	32/32
SB1602	12	60.5/71.5	63/63
SB2710	6	85/105	50/32
Hazardous area connection			
Connection	terminals 13, 23		
Safe area connection			
Connection	terminals 11, 21		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		
Mechanical specifications			
Protection degree	IP20 (installed on Terminal Base or Termination Board)		
Connection	wiring via Terminal Base or Termination Board		
Mass	approx. 70 g		
Dimensions	9.7 x 70.4 x 68.2 mm (0.4 x 2.8 x 2.7 in)		
Mounting	Terminal Base or Termination Board mounting on 35 mm DIN rail acc. to DIN EN 60715		
Data for application in conjunction with hazardous areas	see page 480 for entity parameters		
EC-Type Examination Certificate	TÜV 99 ATEX 1449 X		
Group, category, type of protection	⟨Ex⟩ II (1)G [Ex ia] IIC ⟨Ex⟩ II (1)D [Ex iaD]		
UL approval			
Control drawing	16-557UL-12 (cULus)		

Diagrams

Front view







Edition 908837 (US) / 208599 (EU) 11/2010

Technical data

Model number	Working voltage at 2 µA (V)	Max. series resistance (Ω) without back-up fuse/with back-up fuse	Fuse rating (mA) internal fuse/back-up fuse
SB0014	6.5	1768.5/1776.5	80/80
SB0015	5	71/75	125/100
SB0016	6	100/106	100/80
SB0022	2.5	801/804	160/125
SB0044	8.5	165.5/174.5	80/63
SB0045	8.5	1020.5/1029.5	80/63
SB0201	2	36.5/40	160/125
SB0305	1.25	402/405	160/125
SB0751	2	10.8/14.1	160/125
SB0761	6	142.5/149	100/80
SB0766	10	188.5/208	50/32
SB1761	7	385/405	50/32
SB1766	9.8	90.5/110	50/32
SB2764	10	1077/1096	50/32
Hazardous area connection			
Connection	terminals 13; 23		
Safe area connection			
Connection	terminals 11; 21		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		
Mechanical specifications			
Protection degree	IP20 (installed on Terminal Base or Termination Board)		
Connection	wiring via Terminal Base or Termination Board		
Mass	approx. 70 g		
Dimensions	9.7 x 70.4 x 68.2 mm (0.4 x 2.8 x 2.7 in)		
Mounting	Terminal Base or Termination Board mounting on 35 mm DIN rail acc. to DIN EN 60715		
Data for application in conjunction with hazardous areas	see page 480 for entity parameters		
EC-Type Examination Certificate	TÜV 99 ATEX 1449 X		
Group, category, type of protection	⟨Ex⟩ II (1)G [Ex ia] IIC ⟨Ex⟩ II (1)D [Ex iaD]		
UL approval			
Control drawing	16-557UL-12 (cULus)		

Features

- **2-channel**
- **AC version**
- **Terminal Base or Termination Board mounting, pluggable**
- **Replaceable fuse**

Function

The SB-System Zener Barriers provide protection for electrical signals within hazardous areas.

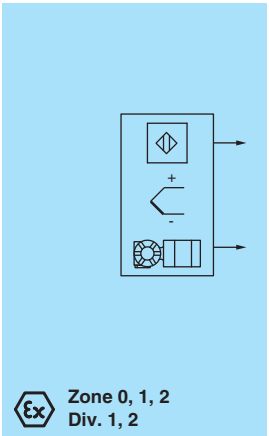
The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has alternating polarities, i. e. interconnected Zener diodes are employed and one side is grounded. The Zener Barrier can be used for both alternating voltage signals and direct voltage signals.

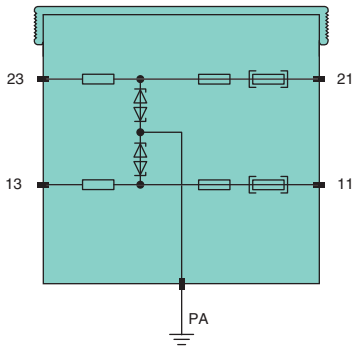
Additionally this Zener Barrier is equipped with a replaceable back-up fuse.

Zener Barriers will be supplied without Terminal Base or Termination Board. Please order separately.

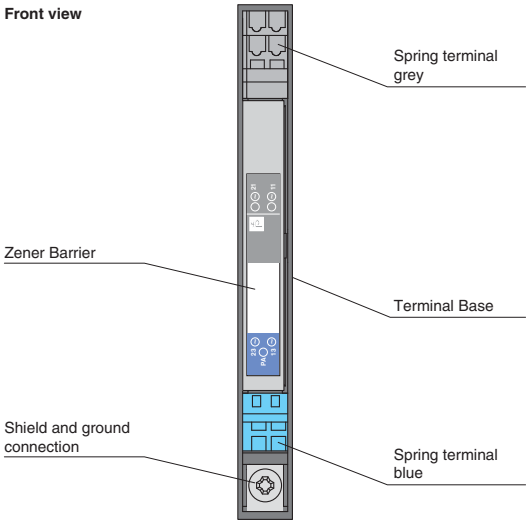
Diagrams



⟨Ex⟩ **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2



Edition 908837 (US) / 208599 (EU) 11/2010

Features

- **2-channel**
- **AC version**
- **Terminal Base or Termination Board mounting, pluggable**
- **Replaceable fuse**
- **Star connection**

Function

The SB-System Zener Barriers provide protection for electrical signals within hazardous areas.

The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has alternating polarities, i. e. interconnected Zener diodes are employed and one side is grounded. The Zener Barrier can be used for both alternating voltage signals and direct voltage signals.

Additionally this Zener Barrier is equipped with a replaceable back-up fuse.

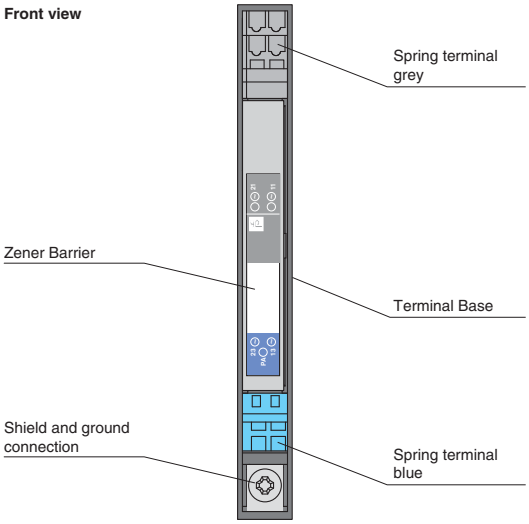
Zener Barriers will be supplied without Terminal Base or Termination Board. Please order separately.

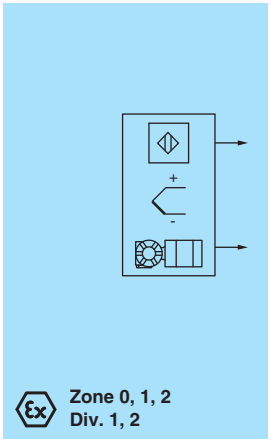
Technical data

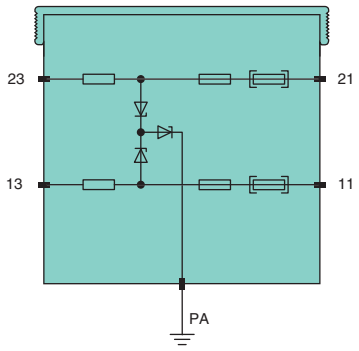
Model number	Working voltage at 2 µA (V)	Max. series resistance (Ω) without back-up fuse/with back-up fuse	Fuse rating (mA) internal fuse/back-up fuse
SB0036	5	3400/3400	32/32
SB0760	6	92.5/112	32/32
SB0765	12	147.5/167.5	32/32
SB0772	18	363.5/383.5	32/32
SB0778	24	689/709	32/32
Hazardous area connection			
Connection	terminals 13; 23		
Safe area connection			
Connection	terminals 11; 21		
Ambient conditions			
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)		
Mechanical specifications			
Protection degree	IP20 (installed on Terminal Base or Termination Board)		
Connection	wiring via Terminal Base or Termination Board		
Mass	approx. 70 g		
Dimensions	9.7 x 70.4 x 68.2 mm (0.4 x 2.8 x 2.7 in)		
Mounting	Terminal Base or Termination Board mounting on 35 mm DIN rail acc. to DIN EN 60715		
Data for application in conjunction with hazardous areas	see page 480 for entity parameters		
EC-Type Examination Certificate	TÜV 99 ATEX 1449 X		
Group, category, type of protection	Ⓔx II (1)G [Ex ia] IIC Ⓔx II (1)D [Ex iaD]		
UL approval			
Control drawing	16-557UL-12 (cULus)		

Diagrams

Front view







Edition 908837 (US) / 208599 (EU) 11/2010

Technical data

Model number	Max. series resistance (Ω) without back-up fuse/with back-up fuse	Fuse rating (mA) internal fuse/back-up fuse
SB0604	90.5/107	50/50
Hazardous area connection		
Connection	terminals 13, 23	
Output voltage	12 V DC, stabilized	
Safe area connection		
Connection	terminals 11, 21	
Input voltage	24 V DC	
Ambient conditions		
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)	
Mechanical specifications		
Protection degree	IP20 (installed on Terminal Base or Termination Board)	
Connection	wiring via Terminal Base or Termination Board	
Mass	approx. 70 g	
Dimensions	9.7 x 70.4 x 68.2 mm (0.4 x 2.8 x 2.7 in)	
Mounting	Terminal Base or Termination Board mounting on 35 mm DIN rail acc. to DIN EN 60715	
Data for application in conjunction with hazardous areas	see page 480 for entity parameters	
EC-Type Examination Certificate	TÜV 99 ATEX 1449 X	
Group, category, type of protection	⟨Ex⟩ II (1)G [Ex ia] IIC ⟨Ex⟩ II (1)D [Ex iaD]	
UL approval		
Control drawing	16-557UL-12 (cULus)	

Features

- **1-channel**
- **DC version, positive polarity**
- **12 V DC supply**
- **Input voltage 24 V at 2 µA**
- **Output voltage 12 V at 2 µA**
- **Terminal Base or Termination Board mounting, pluggable**
- **Replaceable fuse**

Function

The SB-System Zener Barriers provide protection for electrical signals within hazardous areas.

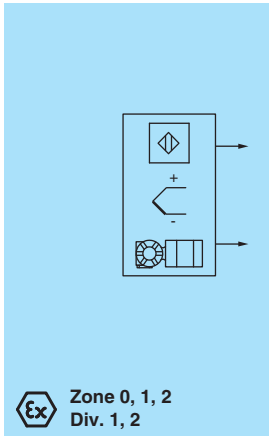
The Zener diodes in the Zener Barriers are connected in the reverse direction. The breakdown voltage of the diodes is not exceeded in normal operation. If this voltage is exceeded, due to a fault in the safe area, the diodes start to conduct, causing the fuse to blow.

The Zener Barrier has a positive polarity, i. e. the anodes of the Zener diodes are grounded.

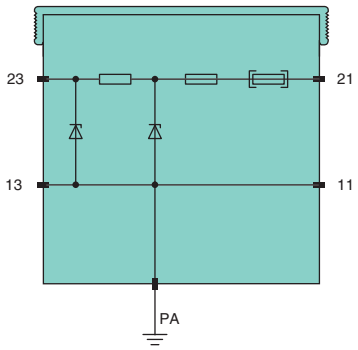
It supplies field devices with 12 V DC. Additionally this Zener Barrier is equipped with a replaceable back-up fuse.

Zener Barriers will be supplied without Terminal Base or Termination Board. Please order separately.

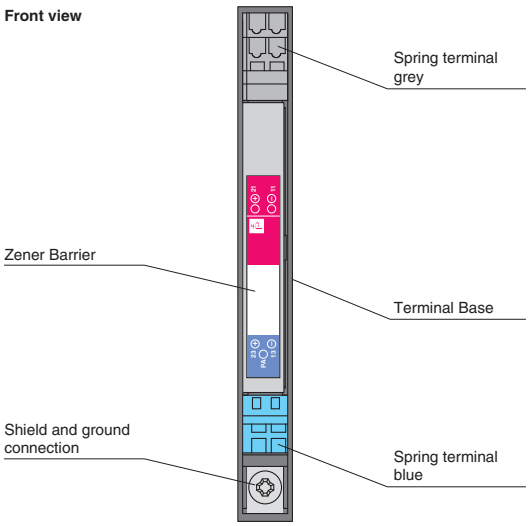
Diagrams



⟨Ex⟩ **Zone 0, 1, 2**
Div. 1, 2



Zone 2
Div. 2



Edition 908837 (US) / 208599 (EU) 11/2010

ATEX Entity Parameters

Model Number	Terminals	U_o (V)	I_o (mA)	P_o (mW)
SB0014	13, 23, PA	9.5/9.5	6/6	14/14
SB0015	13, 23, PA	7.4/7.4	118/118	220/220
SB0016	13, 23, PA	8.8/8.8	98/98	215/215
SB0017	13, 23, PA	5.4/5.4	10/10	13/13
SB0018	13, 23, PA	9.6	97	230
SB0019	13, 23, PA	15.8/15.8	190/88	73/345
SB0020	13, 23, PA	15.8/15.8	190/190	750/750
SB0021	13, 23, PA	19.1	203	970
SB0022	13, 23, PA	4.4/4.4	6/6	6/6
SB0023	13, 23, PA	19.1	22	106
SB0024	13, 23, PA	16.8	118	495
SB0026	13, 23, PA	6.3	225	355
SB0027	13, 23, PA	20	36	180
SB0028	13, 23, PA	20.1	258	1300
SB0029	13, 23, PA	20.1	106	532
SB0030	13, 23, PA	5.9/5.9	59/59	87/87
SB0031	13, 23, PA	8.6/8.6	15/15	33/33
SB0033	13, 23, PA	14.3	291	1040
SB0035	13, 23, PA	6.3/6.3	6.4/6.4	10/10
SB0036	13, 23, PA	9.6/9.6	3/3	7/7
SB0037	13, 23, PA	8.8	57	126
SB0040	13, 23, PA	5.9/5.9	140/140	207/207
SB0041	13, 23, PA	8.6/8.6	4.4/4.4	9.4/9.4
SB0042	13, 23, PA	5.9/5.9	30/30	44/44
SB0043	13, 23, PA	9.9	170	420
SB0044	13, 23, PA	10.5/10.5	69/69	180/180
SB0045	13, 23, PA	10.5/10.5	11/11	29/29
SB0201	13, 23, PA	5.3/5.3	178/178	236/236
SB0305	13, 23, PA	4.4/4.4	11/11	12/12
SB0601	13, 23, PA	13.1	182	596
SB0604	13, 23, PA	6.5	246	1040
SB0613	13, 23, PA	8.6	414	891
SB0614	13, 23, PA	8.6	100	215
SB0710	13, 23, PA	10	200	500
SB0715	13, 23, PA	15	150	562
SB0722	13, 23, PA	22	150	825
SB0728	13, 23, PA	28	93	651
SB0751	13, 23, PA	5/5	990/990	1240/1240
SB0760	13, 23, PA	10/10	200/200	500/500
SB0761	13, 23, PA	9/9	100/100	225/225
SB0764	13, 23, PA	12/12	12/12	36/36
SB0765	13, 23, PA	15/15	150/150	563/563
SB0766	13, 23, PA	12/12	80/80	240/240
SB0767	13, 23, PA	15/15	150/150	562/562
SB0768	13, 23, PA	22/22	147/147	808/808
SB0772	13, 23, PA	22/22	73/73	402/402
SB0778	13, 23, PA	28/28	47/47	329/329
SB0779	13, 23, PA	28/28	93/93	651/651
SB0786	13, 23, PA	28/28	100/100	40/40
SB0788	13, 23, PA	10/28	200/93	500/651
SB0796	13, 23, PA	26/20	87/51	565/255
SB1203	13, 23, PA	27.1	66	449
SB1206	13, 23, PA	16.8	62	260
SB1250	13, 23, PA	15	403	1510
SB1301	13, 23, PA	17.2	414	1612

Edition 908837 (US) / 208599 (EU) 11/2010

Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0002 pa-info@us.pepperl-fuchs.com
Germany: +49 621 776 2222 pa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 pa-info@sg.pepperl-fuchs.com

Model Number	Terminals	U_o (V)	I_o (mA)	P_o (mW)
SB1302	13, 23, PA	25.2	25	143
SB1303	13, 23, PA	29.4	248	1723
SB1350	13, 23, PA	11.7/11.7	174/25	506/73
SB1351	13, 23, PA	11.7/11.7	25/25	73/73
SB1502	13, 23, PA	16.8	330	130
SB1602	13, 23, PA	16.8	390	1638
SB1613	13, 23, PA	8.6	414	891
SB1710	13, 23, PA	10	200	500
SB1715	13, 23, PA	15	150	562
SB1728	13, 23, PA	28	93	651
SB1761	13, 23, PA	9/9	25/25	56/56
SB1766	13, 23, PA	12/12	160/160	480/480
SB1767	13, 23, PA	15/15	150/150	562/562
SB1787	13, 23, PA	28/28	93/100	651/40
SB2206	13, 23, PA	16.8	62	260
SB2250	13, 23, PA	15	403	1510
SB2401	13, 23, PA	33.6	67	535
SB2420	13, 23, PA	27.3	208	1420
SB2424	13, 23, PA	28.4	24	170
SB2427	13, 23, PA	26.3/26.3	300/102	115/671
SB2710	13, 23, PA	10	200	500
SB2764	13, 23, PA	12/12	12/12	36/36
SB2787	13, 23, PA	28/28	300/120	115/840
SB3250	13, 23, PA	15/15	387/387	1450/1450
SB3420	13, 23, PA	27.3	208	1420
SB3710	13, 23, PA	10	300	750
SB3715	13, 23, PA	15	291	1091
SB3722	13, 23, PA	22	213	1172
SB3728	13, 23, PA	28	120	840
SB3729	13, 23, PA	28	171	1197
SB4250	13, 23, PA	15/15	387/387	1450/1450
SB4410	13, 23, PA	27.3/27.3	147/147	1000/1000
SB4420	13, 23, PA	27.3/27.3	208/208	1420/1420
SB4710	13, 23, PA	10	300	750
SB4715	13, 23, PA	15	291	1091
SB4722	13, 23, PA	22	213	1172
SB5410	13, 23, PA	27.3/27.3	147/147	1000/1000
SB5420	13, 23, PA	27.3/27.3	208/208	1420/1420

Edition 908837 (US) / 208599 (EU) 11/2010

UL Entity Parameters

Model Number	Terminals	V_{oc} (V)	I_{sc} (mA)	V_t (V)	I_t (mA)
SB0014	13, 23, PA	–	–	19	12
	13, PA	9.5	6	–	–
	23, PA	9.5	6	–	–
	13, 23	19	6	–	–
SB0015	13, 23, PA	–	–	14.8	236
	13, PA	7.4	118	–	–
	23, PA	7.4	118	–	–
	13, 23	14.8	118	–	–
SB0016	13, 23, PA	–	–	17.6	196
	13, PA	8.8	98	–	–
	23, PA	8.8	98	–	–
	13, 23	17.6	98	–	–
SB0017	13, 23, PA	–	–	6.3	20
	13, PA	5.4	10	–	–
	23, PA	5.4	10	–	–
	13, 23	6.3	6	–	–
SB0018	13, 23, PA	9.6	97	–	–
SB0019	13, 23, PA	–	–	17.6	88
	13, PA	15.8	88	–	–
	23, PA	15.8	190	–	–
	13, 23	17.6	88	–	–
SB0020	13, 23, PA	–	–	17.6	380
	13, PA	15.8	190	–	–
	23, PA	15.8	190	–	–
	13, 23	17.6	106	–	–
SB0021	13, 23	19.1	203	–	–
SB0022	13, 23, PA	–	–	8.8	12
	13, PA	4.4	6	–	–
	23, PA	4.4	6	–	–
	13, 23	8.8	6	–	–
SB0023	13, 23	19.1	22	–	–
SB0026	13, 23, PA	6.3	225	–	–
SB0027	13, 23, PA	20	36	–	–
SB0201	13, 23	5.3/5.3	178/178	–	–
SB0601	13, 23	13.1	182	–	–
SB0604	13, 23, PA	6.5	246	–	–
SB0710	13, 23	10	200	–	–
SB0715	13, 23	15	150	–	–
SB0722	13, 23	22	150	–	–
SB0728	13, 23	28	93	–	–
SB0751	13, 23, PA	–	–	10	1980
	13, PA	5	990	–	–
	23, PA	5	990	–	–
	13, 23	10	990	–	–
SB0760	13, 23	10/10	200/200	–	–
SB0761	13, 23	9/9	100/100	–	–
SB0764	13, 23	12/12	12/12	–	–
SB0765	13, 23	15/15	150/150	–	–
SB0766	13, 23	12/12	80/80	–	–
SB0767	13, 23	15/15	150/150	–	–
SB0768	13, 23	22/22	147/147	–	–
SB0772	13, 23	22/22	73/73	–	–
SB0778	13, 23	28/28	47/47	–	–
SB0779	13, 23	28/28	93/93	–	–
SB0786	13, 23	28/28	100/100	–	–
SB0788	13, 23	10/28	200/93	–	–
SB0796	13, 23	26/20	87/51	–	–

Edition 908837 (US) / 208599 (EU) 11/2010

Model Number	Terminals	V_{oc} (V)	I_{sc} (mA)	V_t (V)	I_t (mA)
SB1301	13, 23	17.2	414	–	–
SB1302	13, 23	25.2	25	–	–
SB1303	13, 23	29.4	248	–	–
SB1350	13, 23	11.7/11.7	174/25	–	–
SB1351	13, 23	11.7/11.7	25/25	–	–
SB1502	13, 23	16.8	330	–	–
SB1602	13, 23	16.8	390	–	–
SB1710	13, 23	10	200	–	–
SB1715	13, 23	15	150	–	–
SB1722	13, 23	22	150	–	–
SB1728	13, 23	28	93	–	–
SB1761	13, 23	9/9	25/25	–	–
SB1764	13, 23	12/12	12/12	–	–
SB1766	13, 23	12/12	160/160	–	–
SB1767	13, 23	15/15	150/150	–	–
SB1768	13, 23	22/22	147/147	–	–
SB1787	13, 23	28/28	93/100	–	–
SB1788	13, 23	10/28	200/93	–	–
SB1796	13, 23	26/20	87/51	–	–
SB2350	13, 23	11.7/11.7	174/25	–	–
SB2351	13, 23	11.7/11.7	25/25	–	–
SB2420	13, 23, PA	27.3	208	–	–
SB2427	13, 23	26.3/26.3	300/102	–	–
SB2710	13, 23	10	200	–	–
SB2764	13, 23	12/12	12/12	–	–
SB2787	13, 23	28/28	300/120	–	–
SB3250	13, 23, PA	–	–	16.9	774
	13, PA	15	387	–	–
	23, PA	15	387	–	–
	13, 23	16.9	217	–	–
SB3420	13, 23, PA	27.3	208	–	–
SB3710	13, 23	10	300	–	–
SB3715	13, 23	15	291	–	–
SB3722	13, 23	22	213	–	–
SB3728	13, 23	28	120	–	–
SB3729	13, 23	28	171	–	–
SB4410	13, 23, PA	–	–	29.1	294
	13, PA	27.3	147	–	–
	23, PA	27.3	147	–	–
	13, 23	29.1	79	–	–
SB4420	13, PA	27.3	208	–	–
	23, PA	27.3	208	–	–
	13, 23	29.1	111	–	–
SB4250	13, 23, PA	–	–	16.9	774
	13, PA	15	387	–	–
	23, PA	15	387	–	–
	13, 23	16.9	217	–	–
SB4710	13, 23	10	300	–	–
SB4715	13, 23	15	291	–	–
SB4722	13, 23	22	213	–	–
SB4728	13, 23	28	120	–	–
SB5410	13, 23, PA	–	–	29.1	294
	13, PA	27.3	147	–	–
	23, PA	27.3	147	–	–
	13, 23	29.1	79	–	–
SB5420	13, PA	27.3	208	–	–
	23, PA	27.3	208	–	–
	13, 23	19	111	–	–

Edition 908837 (US) / 208599 (EU) 11/2010

Terminal Base SB9101

Features

- For 1 SB Zener Barrier

Termination Board SB9106

Features

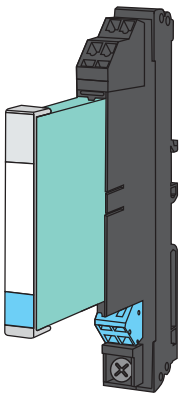
- For 6 SB Zener Barriers

Termination Board SB9100

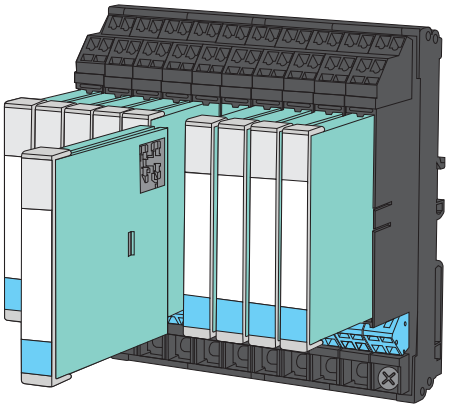
Features

- For 10 SB Zener Barriers

Terminal Base
SB9101



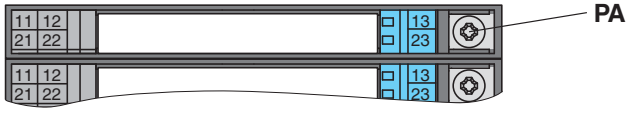
Termination Board
SB9100



Technical data

Mechanical specifications	
Dimensions	SB9101: 13 x 125 x 96.5 mm (0.5 x 4.9 x 3.8 in) SB9106: 73 x 125 x 96.5 mm (2.9 x 4.9 x 3.8 in) SB9100: 119.5 x 125 x 96.5 mm (4.7 x 4.9 x 3.8 in) height including module assembly

Electrical connection



Terminals 11, 21 Connection safe area (control side)
Terminals 12, 22 Activation of the LED by connecting the terminals 12, 22 with (-)
Terminals 13, 23 Connection hazardous area (field side)

Grounding Rail SB9220

Features

- For 20 SB Zener Barriers

SB9221

Features

- For 10 SB Zener Barriers

SB9222

Features

- For 6 SB Zener Barriers

Edition 908837 (US) / 208599 (EU) 11/2010

Pepperl+Fuchs Group www.pepperl-fuchs.com
USA: +1 330 486 0002 pa-info@us.pepperl-fuchs.com
Germany: +49 621 776 2222 pa-info@de.pepperl-fuchs.com
Singapore: +65 6779 9091 pa-info@sg.pepperl-fuchs.com

Edition 908837 (US) / 208599 (EU) 11/2010