

Introduction

To protect the signal lines of field devices and systems in the cabinet against lightning, Pepperl+Fuchs covers the complete range of Surge Protection Barriers.

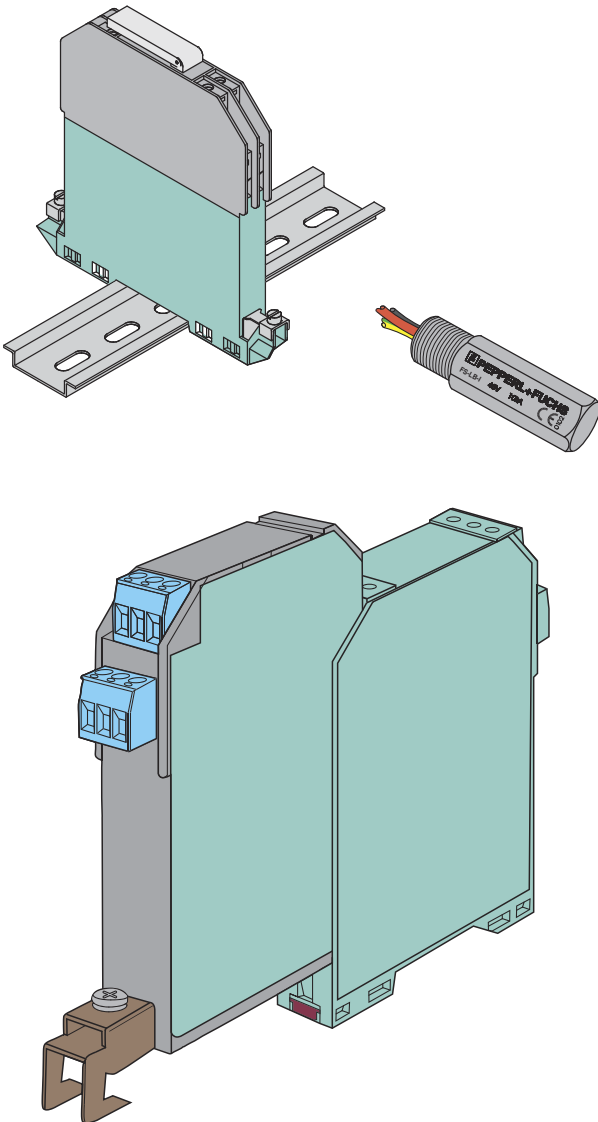


Figure 1 Various Surge Protection Barriers

Housing types

Depending on the location you have to protect, we offer 3 different versions of Surge Protection Barriers.

DIN rail mount modules (K-LB-*.**)

- Compact housing, 12.5 mm wide
- Protection of field devices and control devices
- Single and dual channel versions
- Grounded versions for zener barrier applications



Figure 2 Surge protection K-LB-*.**

Field mount modules (F*-LB-I)

- Screw in type for field devices
- Protection of field devices
- ½ NPT, M20 and PG13.5 thread versions
- Floating versions



Figure 3 Surge protection F*-LB-I

Plug-in modules (P-LB-*.**)

- Plug-in version for the 20 mm devices of the K-System
- Protection of K-System inputs
- For isolated barriers and signal conditioners
- Single and dual channel versions

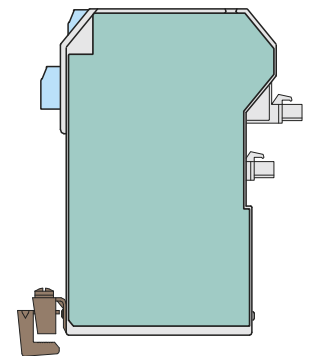


Figure 4 Surge protection P-LB-*.**

Mounting and grounding

The correct installation of the Surge Protection Barrier (SPB) is very important. It must be ensured that the unprotected wiring does not influence the wiring on the protected side. Proper cable routing should ensure a sufficient cable distance between wires of the unprotected, earth connected and protected side. Depending on the mounting place, there are different possibilities for mounting and earthing.

Topology

To protect the electrical equipment in both the control room and the hazardous area, two Surge Protection Barriers must be integrated into the intrinsically safe circuit loop. Following the international standard EN 60079-14, intrinsically safe circuits can either be connected "at one point to the equipotential bonding system if this exists over the whole area in which the intrinsically safe circuits are installed" or "isolated from earth". International Standard EN 60079-14 states "if intrinsically safe apparatus (field devices, Surge Protection Barriers and intrinsically safe barriers) do not withstand the electrical strength test with at least 500 V from earth, a connection to earth at the apparatus is to be assumed".

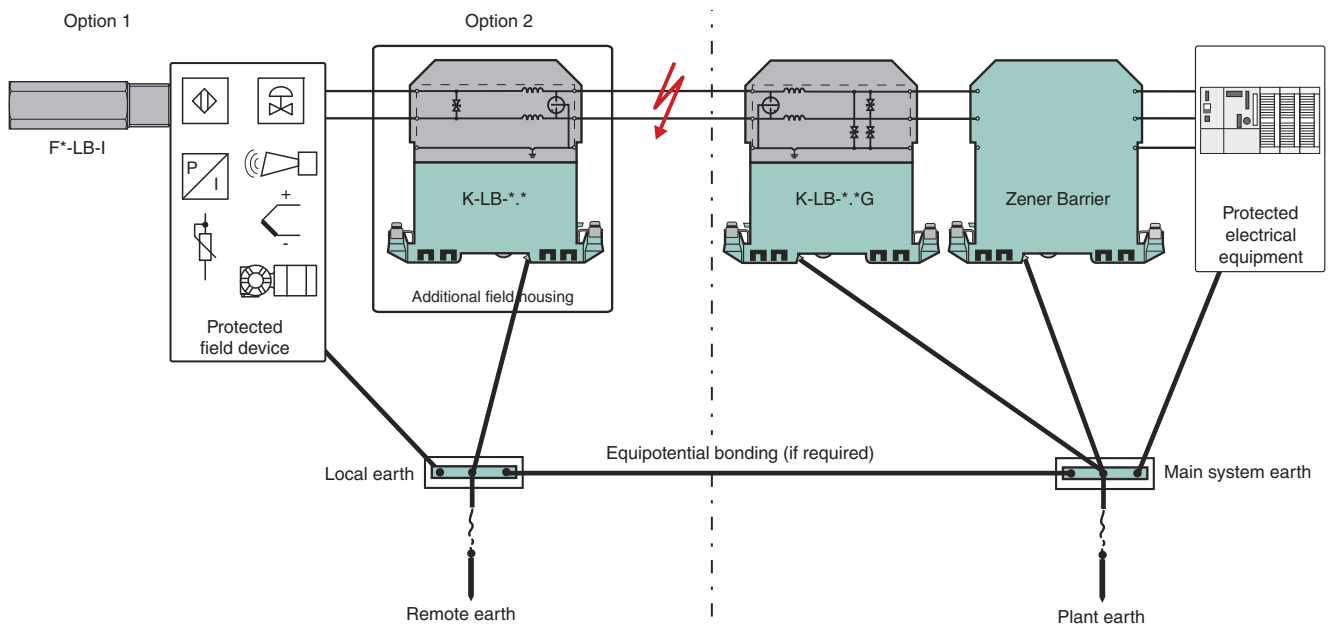


Figure 5 One point ground connection

DIN rail mount modules (K-LB-*.**)

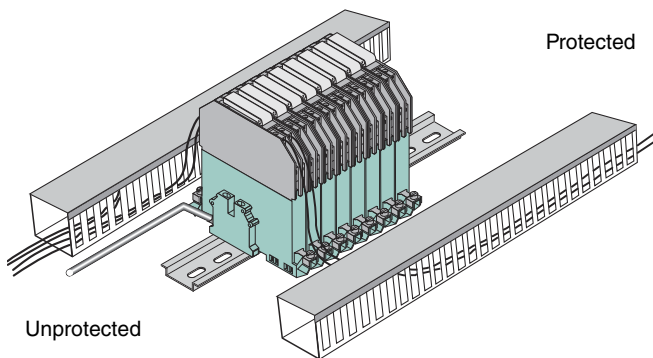


Figure 6 DIN rail mount module grounding

Field mount modules (F*-LB-I)

The screw-in F*-LB-I is screwed directly into the field device using the spare cable entry. Three wires are connected in parallel to the field device's signals and earth line.

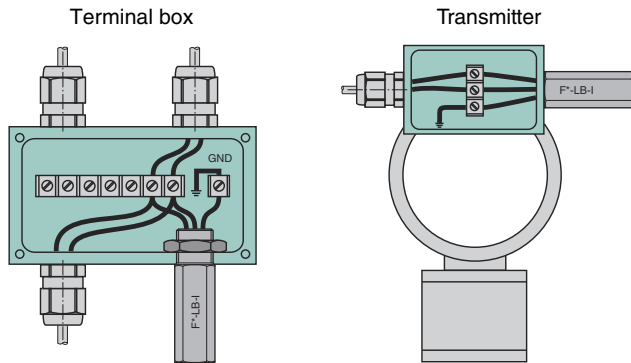


Figure 7 Field mount module grounding

Plug-in modules (P-LB-*.**)

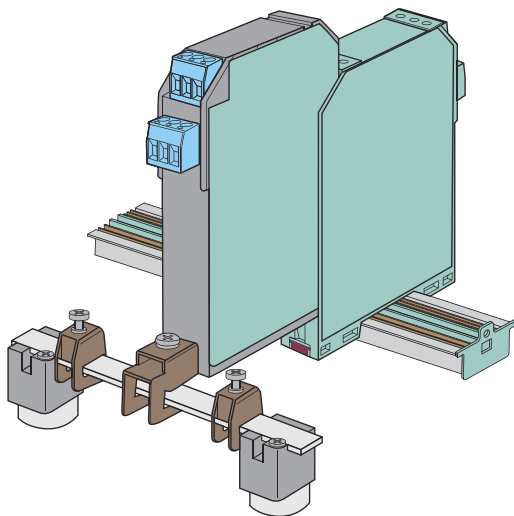


Figure 8 Plug-in module grounding

Protection

Unprotected signal loop

Since lightning-induced signals show pulse characteristics, standard circuit breakers or fuses are not able to sufficiently protect the electrical equipment. It can also be used for protection against other sources causing transient voltages like devices changing voltages or currents during switching events or exhibiting a non-linear behavior. These other sources are energy storing inductive loads, such as transformers, motors and drives. They can induce high transient voltages and surge currents on conductors that can damage connected equipment. Each electronic device in the loop should be protected with a Surge Protection Barrier.

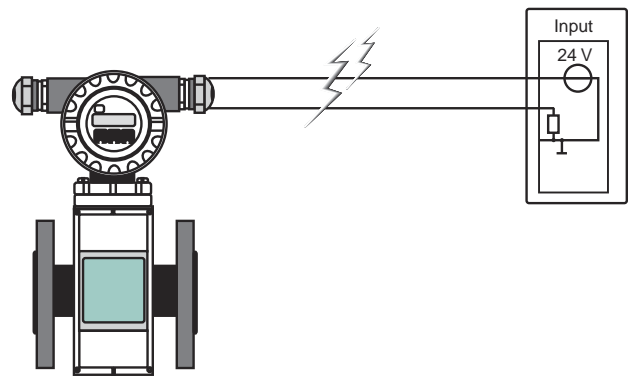


Figure 9 Unprotected signal loop

Protection of the field device

Two options are available for the protection of the field device:

Option 1

The standard DIN Rail mounted K-LB-*.** is located close to the field device. It should be placed within a field enclosure and mounted on a grounded rail. The SPB must be locally bonded to control the local potential between the signal cables and the structure.

Option 2

The screw-in F*-LB-I is screwed directly into the field device using the spare cable entry. Three wires are connected in parallel to the field device's signals and earth line. This will ensure a line-to-line and line-to-earth protection.

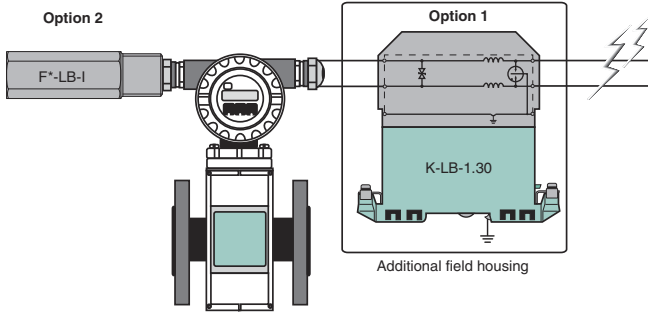


Figure 10 Protection of the field device

Protection of control side (cabinet)

Protection without isolation

To protect the zener barrier, a non-isolated, separately mounted Surge Protection Barrier must be installed and connected to the intrinsically safe side of the zener barrier. The barrier's earth connection is made, following the described guidelines, to the main system earth in parallel to the equipment and zener barrier earth cable.

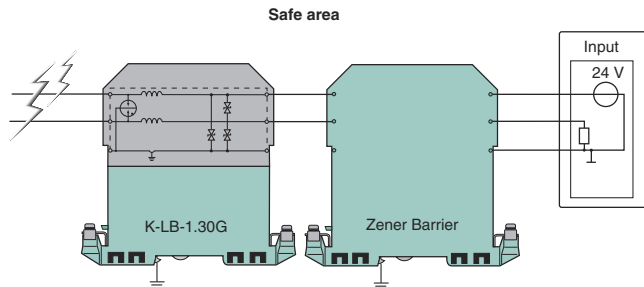


Figure 11 Protection without isolation

Protection with isolation

The entire intrinsically safe circuit is isolated from earth. The intrinsically safe barrier is an isolated barrier and no connection to the main system earth is necessary. To maintain the intrinsically safe measurement loop galvanically isolated from earth, an isolated Surge Protection Barrier must be installed at both ends of the loop. This must be close to the isolated barrier, connected to its intrinsically safe side in the safe area and close to the field device in the hazardous area, but outside Zone 0.

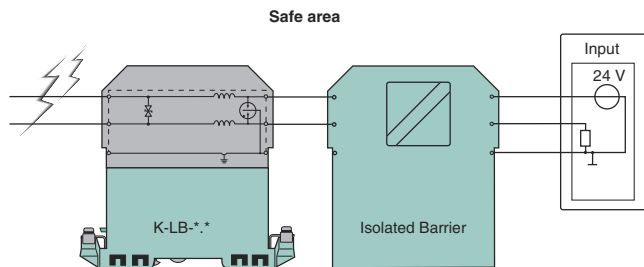


Figure 12 Protection with isolation

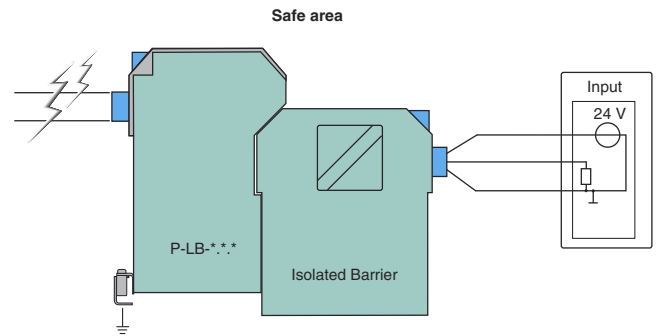


Figure 13 Protection with isolation

Model number description

DIN rail mount modules

[]	-	-	.	[]	[]
K		LB		6	30
			1	2	
			G Grounded		
			Rated voltage 6 V		
			Rated voltage 30 V		
			1-channel (2-wire protection)		
			2-channel (4-wire protection)		
			Lightning barrier		
DIN rail mount modules					

Field mount modules

[]	-	-	
FN		LB	
FP			
FS			
Intrinsic safety Ex "i"			
Lightning barrier			
Field mount modules with 1/2 NPT thread			
Field mount modules with PG13.5 thread			
Field mount modules with M20 x 1.5 thread			

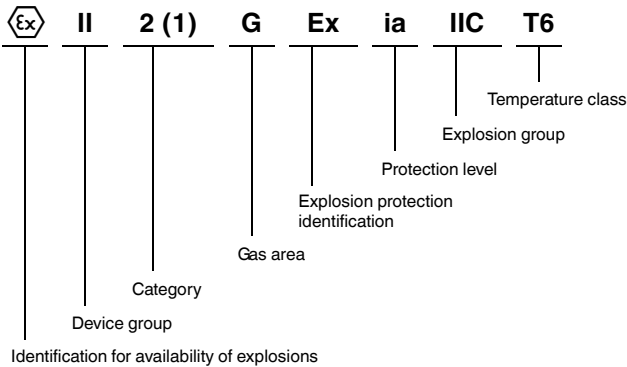
Plug-in modules

[]	-	-	.	[]	[]
P		LB		1	2
			1	2	
			Protected terminals		
			1-channel		
			2-channel		
			Lightning barrier		
Plug-in modules					

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Safety Information for K-LB-*.** DIN rail mount modules

The highest ignition protection class to be reached is



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 warranty or manufacturer's responsibility.

Surge Protection Barriers are used as modules positioned upstream in the circuit from the corresponding electrical equipment. They make it possible to protect against overvoltages originating from various causes (lightning strikes, switching processes, etc.). This is achieved by diverting the transient current and limiting the voltage throughout the duration of the overvoltage surge. Various modules are available for protecting 2 or 4 conductors.

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.

Application

Surge Protection Barriers themselves can be installed within the hazardous area of Zone 1. They can be used for intrinsically safe circuits up to Ex ia IIC. The ignition protection class is determined by the connected intrinsically safe circuit of the corresponding electrical equipment.

Surge Protection Barriers are **not** used to separate intrinsically safe circuits from non-intrinsically safe circuits.

Surge Protection Barriers must **not** be installed in dust Ex-zones.

Installation and commissioning in connection with hazardous areas

Commissioning and installation must be performed only by specialists who are trained specifically for this purpose.

The quality of the ground is a significant precondition for problem-free overvoltage protection. Short connections and large cable cross-sections are basic requirements for effective protection. These requirements can be fulfilled through the use of appropriate accessories (see data sheets).

Potential compensation must be set up for Surge Protection Barriers of types K-LB-*.G along the intrinsically safe circuits inside and outside of the hazardous area

Surge Protection Barriers modules are designed in the IP20 protection class in accordance with EN 60529 and must be protected against adverse environmental conditions such as splashed water or dirt beyond pollution degree 2.

Depending on the ignition protection class, the circuits of Surge Protection Barriers may be directed in Zone 1 or 0. Special attention must be paid to a secure separation from all non-intrinsically safe circuits in this context. A shortest path distance of at least 50 mm must be maintained between intrinsically safe and non-intrinsically safe conducting terminal blocks during assembly. The ignition protection class is determined by the connected intrinsically safe circuit of the corresponding electrical equipment.

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

The respective maximum values of the field device, the Surge Protection Barriers and the corresponding electrical equipment as defined by explosion protection must be observed for interconnecting with intrinsically safe electrical equipment (proof of intrinsic safety). EN 60079-14/IEC 60079-14 must be observed (where appropriate).

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.

The use of this device must not change the ignition protection category of the supplying circuit. Thus, for example, ib circuits must not enter Zone 0, even if they are controlled via this device – unless otherwise stated in the related approval.

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 not allowed.

Isolation coordinates for devices with Ex-certificate in accordance with 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.

Ambient conditions

Ambient temperature

-30 °C to 60 °C (243 K to 333 K)

Exceptions see data sheets.

Storage temperature

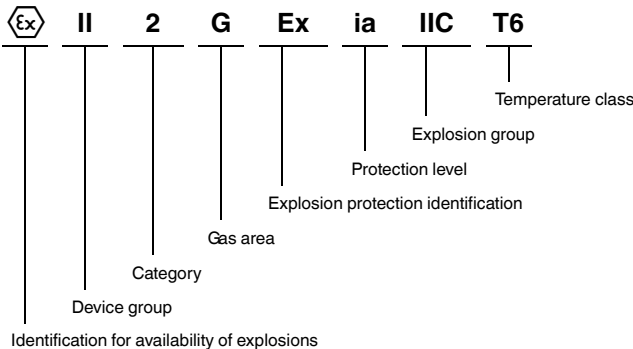
-30 °C to 80 °C (243 K to 353 K)

Relative humidity

max. 75 % without moisture condensation

Safety Information for F*-LB-I field mount modules

The highest ignition protection class to be reached is



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 warranty or manufacturer's responsibility.

Surge Protection Barriers are used as protective modules for intrinsically safe field devices and the corresponding electrical equipment. They make it possible to protect against overvoltages originating from various causes (lightning strikes, switching processes, etc.). This is achieved by diverting the transient current and limiting the voltage throughout the duration of the overvoltage surge.

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.

Application

Surge Protection Barriers themselves can be installed within the hazardous area of Zone 1. They can be used for intrinsically safe circuits up to Ex ia IIC. The ignition protection class is determined by the connected intrinsically safe circuit of the corresponding electrical equipment.

Surge Protection Barriers must **not** be installed in dust Ex-zones.

Installation and commissioning in connection with hazardous areas

Commissioning and installation must be performed only by specialists who are trained specifically for this purpose.

The quality of the ground is a significant precondition for problem-free overvoltage protection. Short connections and large cable cross-sections are basic requirements for effective protection.

Depending on the ignition protection class, the circuits of Surge Protection Barriers may be directed in Zone 1 or 0. Special attention must be paid to a secure separation from all non-intrinsically safe circuits in this context. A shortest path distance of at least 50 mm must be maintained between intrinsically safe and non-intrinsically safe conducting terminal blocks during assembly. The ignition protection class is determined by the connected intrinsically safe circuit of the corresponding electrical equipment.

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

The respective maximum values of the field device, the Surge Protection Barriers and the corresponding electrical equipment as defined by explosion protection must be observed for interconnecting with intrinsically safe electrical equipment (proof of intrinsic safety). EN 60079-14/ IEC 60079-14 must be observed (where appropriate).

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.

The use of this device must not change the ignition protection category of the supplying circuit. Thus, for example, ib circuits must not enter Zone 0, even if they are controlled via this device – unless otherwise stated in the related approval.

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 not allowed.

Ambient conditions

Ambient temperature

-30 °C to 60 °C (243 K to 333 K)

Exceptions see data sheets.

Storage temperature

-30 °C to 80 °C (243 K to 353 K)

Relative humidity

max. 75 % without moisture condensation

Safety Information for P-LB-*.*. * plug-in modules

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 warranty or manufacturer's responsibility.

Plug-in terminal modules are used as modules positioned upstream in the circuit from the corresponding electrical equipment. They make it possible to protect against overvoltages originating from various causes (lightning strikes, switching processes, etc.). This is achieved by diverting the transient current and limiting the voltage throughout the duration of the overvoltage surge. Various modules are available for protecting 2, 3, 4 or 6 conductors. The assignment of input connections of plug-in terminal modules/intrinsically safe equipment (binary or analog signals) corresponds to that of the following related equipment (see the corresponding data sheets). Plug-in terminal modules should only be used in combination with a device of the K-System.

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.

Application

Plug-in terminal modules can be installed within the hazardous area of Zone 2/Div. 2. They can be used for intrinsically safe circuits up to Ex ia IIC. The ignition protection class is determined by the connected intrinsically safe circuit of the corresponding electrical equipment.

Plug-in terminal modules are **not** used to separate intrinsically safe circuits from non-intrinsically safe circuits.

Plug-in terminal modules must **not** be installed in dust Ex-zones.

Installation and commissioning in connection with hazardous areas

Commissioning and installation must be performed only by specialists who are trained specifically for this purpose.

The quality of the ground is a significant precondition for problem-free overvoltage protection. Short connections and large cable cross-sections are basic requirements for effective protection. These requirements can be fulfilled through the use of appropriate accessories (see data sheets).

Plug-in terminal modules are designed in the IP20 protection class in accordance with EN 60529 and must be accordingly protected against adverse environmental conditions such as splashed water or dirt beyond pollution degree 2.

Plug-in terminal modules can be installed inside the hazardous area of Zone 2/Div. 2. Since plug-in terminal modules are always used in combination with devices of the K-System, the devices of the K-System must, in this case, be suitable for use in Zone 2/Div. 2. The devices of the K-System must then be installed only in Zone 2/Div. 2 if a corresponding Declaration of Conformity for a named location or a manufacturer's Declaration of Conformity is present. For information on whether this condition has been met, please refer to the data sheets for the devices of the K-System. The instruction manual, the Declaration of Conformity of a named location or the manufacturer's Declaration of Conformity of devices of the K-System and the information in them must be followed.

Depending on the ignition protection class, the circuits of plug-in terminal modules may be directed in Zone 1 or 0. Special attention must be paid to a secure separation from all non-intrinsically safe circuits in this context. A shortest path distance of at least 50 mm must be maintained between intrinsically safe and non-intrinsically safe conducting terminal blocks during assembly. The ignition protection class is determined by the connected intrinsically safe circuit of the corresponding electrical equipment.

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

The respective maximum values of the field device, the plug-in terminal modules and the corresponding electrical equipment as defined by explosion protection must be observed for interconnecting with intrinsically safe electrical equipment (proof of intrinsic safety). EN 60079-14/ IEC 60079-14 must be observed (where appropriate).

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.

The terminal modules must be installed in such a way that they are protected from electrostatic charge.

The use of this device must not change the ignition protection category of the supplying circuit. Thus, for example, ib circuits must not enter Zone 0, even if they are controlled via this device – unless otherwise stated in the related approval.

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 not allowed.

Isolation coordinates for devices with Ex-certificate in accordance with EN 50020 and EN 60079-11

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

Ambient conditions

Ambient temperature

-20 °C to 60 °C (253 K to 333 K)

Storage temperature

-25 °C to 70 °C (248 K to 343 K)

Relative humidity

max. 75 % without moisture condensation

Technical data

For details, see data sheets.