SIEMENS

Fire alarm signal in areas at risk of explosion

Principles, applications, installation, maintenance

001204_m_en_--
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Building Technologies
Control Products and Systems

Technical specifications and availability subject to change without notice.

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1 About this document

Goal and purpose
This document contains all the information you need to use fire detection installations in areas at risk of gas explosions.

Target group
The information in this document is intended for the following target groups:

Group of persons	Activity	Qualification
Product Manager	● Is responsible for information passing between the manufacturer and regional company. ● Coordinates the flow of information between the individual groups of people involved in a project.	● Has obtained suitable specialist training for the function and for the products. ● Has attended the training courses for Product Managers.
Project Manager	● Coordinates the deployment of all persons and resources involved in the project according to schedule. ● Provides the information required to run the project.	● Has obtained suitable specialist training for the function and for the products. ● Has attended the training courses for Project Managers.
Project Engineer, Service technician	● Sets parameters for product depending on specific national and/or customer requirements. ● Checks operability and approves the product for commissioning at the place of installation. ● Is responsible for trouble-shooting.	● Has obtained suitable specialist training for the function and for the products. ● Has attended the training courses for Product Engineer or Service Technician.
Installation personnel	● Assembles and installs the product components at the place of installation. ● Carries out a performance check following installation.	● Has received specialist training in the area of building installation technology or electrical installations.
Maintenance personnel	● Carries out all maintenance work. ● Checks that the products are in perfect working order. ● Searches for and corrects malfunctions.	● Has obtained suitable specialist training for the function and for the products.

Disregard of the safety regulations

Before they are delivered, products are tested to ensure they function correctly when used properly. All liability for personal injury or damage to property caused by misuse or the disregard of the instructions or danger warnings contained in the documentation is disclaimed. This applies to the following in particular:

- Personal injuries or damage to property caused by improper use and incorrect application.
- Personal injuries or damage to property caused by disregarding information relevant to safety in the documentation or on the product.
- Personal injuries or damage to property caused by poor maintenance or lack of maintenance.

Conventions

=>	Result, note
'Text'	Quotation, reproduced identically
-> refer to	Reference

Document identification

Position		Meaning
Title page		Purpose of the document: e.g. mounting, installation
Last page	bottom left	Document number Edition date
Last page	bottom right	Manual Register
Last page	bottom center	SAP order number

Modification index

Version	Date	Brief description
001204_m_en_--	2014-06-30	Change to date format in line with ISO 8601 specifications (yyyy-mm-dd format); Zone module FDCI223/723 added; Point detectors FDOOT241-A9-Ex and OOH740-A9-Ex added; Editorial changes
001204_l_en_--	2010-05	New alarm indicators incorporated; Editorial changes made
001204_k_en_--	2009-04	Document number changed (replaces A6V10213145) Drawings adapted
A6V10213145_a_en_--	2008-11	First edition

2 Introduction

If areas at risk of explosion are monitored using fire detectors, the devices used (electrical equipment) must fulfill certain safety requirements.
In Directive 94/9/EC (ATEX95) the European Union has issued standard requirements of devices and protective systems used in areas at risk of explosion. These are binding for the EU, EEA and Switzerland (bilateral agreements).
Applying the standards governing "electrical equipment for use in explosive atmospheres" issued and harmonized by the CENELEC (European Committee for Electrotechnical Standardization) ensures that the products comply with ATEX.

General provisions		EN 50014	→ EN 60079-0	→ IEC 60079-0
Oil encapsulation	**"o"**	EN 50015	→ EN 60079-6	→ IEC 60079-6
Overpressure encapsulation	**"p"**	EN 50016	→ EN 60079-2	→ IEC 60079-2
Sand encapsulation	**"q"**	EN 50017	→ EN 60079-5	→ IEC 60079-5
Pressure-resistant encapsulation	**"d"**	EN 50018	→ EN 60079-1	→ IEC 60079-1
Increased safety	**"e"**	EN 50019	→ EN 60079-7	→ IEC 60079-7
Intrinsic safety	**"i"**	EN 50020	→ EN 60079-11	→ IEC 60079-11
Encapsulation	**"m"**	EN 50028	→ EN 60079-18	→ IEC 60079-18
Ignition protection method	**"n"**	EN 50021	→ EN 60079-15	→ IEC 60079-15

Several of the main principles and terms are explained in chapters 2, 3 and 4 to improve understanding of the safety requirements for equipment with explosion protection. This focuses on the provisions which are relevant to electrical equipment used in monitoring with fire detectors.

3 Physical/chemical principles of risk of explosion

3.1 Explosive mixture

An inflammable mixture of combustible gas, steam, aerosol or dust and air and/or oxygen is required for an explosion. Ignition itself may come from any source of ignition (electr. sparks, hot parts). Mixtures capable of ignition will however only explode within certain concentration limits. If the mixture is too lean (too much air), there is no risk of explosion. If it is too rich (too high a combustible share), an explosion is possible if more air is added.

During ignition, combustion of the source of ignition automatically propagates in the part of the mixture not as yet used. The speed of combustion in explosions is roughly several meters a second. The increase in pressure is considerable (3 to 10 bar). The noise produced sounds like a sharp detonation because the gases spread suddenly as a result of the rapid increase in temperature. The entire explosion is over within
100 milliseconds.

3.2 Sources of ignition

In real-life situations, the following are considered possible energy sources for ignition in electrical sites:

- electric sparks and arcs
- hot surfaces
- sparks produced mechanically

Other sources of ignition include short-circuits or the rupture of electric cables, electrostatic discharge from system components, lightning strikes etc.

3.3 Ignition temperature

The ignition temperature of a combustible material is the lowest temperature at which ignition of a very highly flammable mixture of gas or steam and air can take place under defined conditions.
The ignition temperatures differ greatly depending on the type of mixture. Not considering self-ignitable materials, the ignition temperatures for gas/air mixtures vary between 100 °C and 700 °C (carbon disulfide 95 °C, petrol 220 °C to 300 °C, ammonia 630 °C).
All gases and steams can be split into accurately definable groups if classified by ignition temperature.

3.4 Flash point

This is the lowest temperature at which a liquid releases enough steam to produce a mixture capable of ignition with air above the liquid's surface.

3.5 Maximum and minimum explosion limit

This is the definition of the range of gas or steam concentration with air in which ignition is possible from a source of ignition (sparks, electric arc, hot surfaces etc.). A mixture below the minimum explosion limit is said to be "too lean" and one above the maximum explosion limit "too fat".

4 Classification of zones within areas at risk of explosion

Following the IEC definition, areas at risk of explosion are classified into three danger zones. The probability (by time and location) of an explosive atmosphere arising are key to this classification.

Zone 0:
Areas in which explosive atmospheres arise permanently or for long periods (e.g. the inside of containers, apparatus etc.).

Zone 1:
Areas in which an explosive atmosphere can be expected to arise only occasionally (e.g. near filling and emptying equipment).

Zone 2:
Areas in which an explosive atmosphere only arises rarely and when it does only for brief periods (e.g. areas surrounding zone 1).
Every industrial site must be individually classified into these zones. Note that the body responsible can classify one single at-risk area into various zones, e.g. the space up to a room height of 1.5 m as zone 1 and the section above this as zone 2.

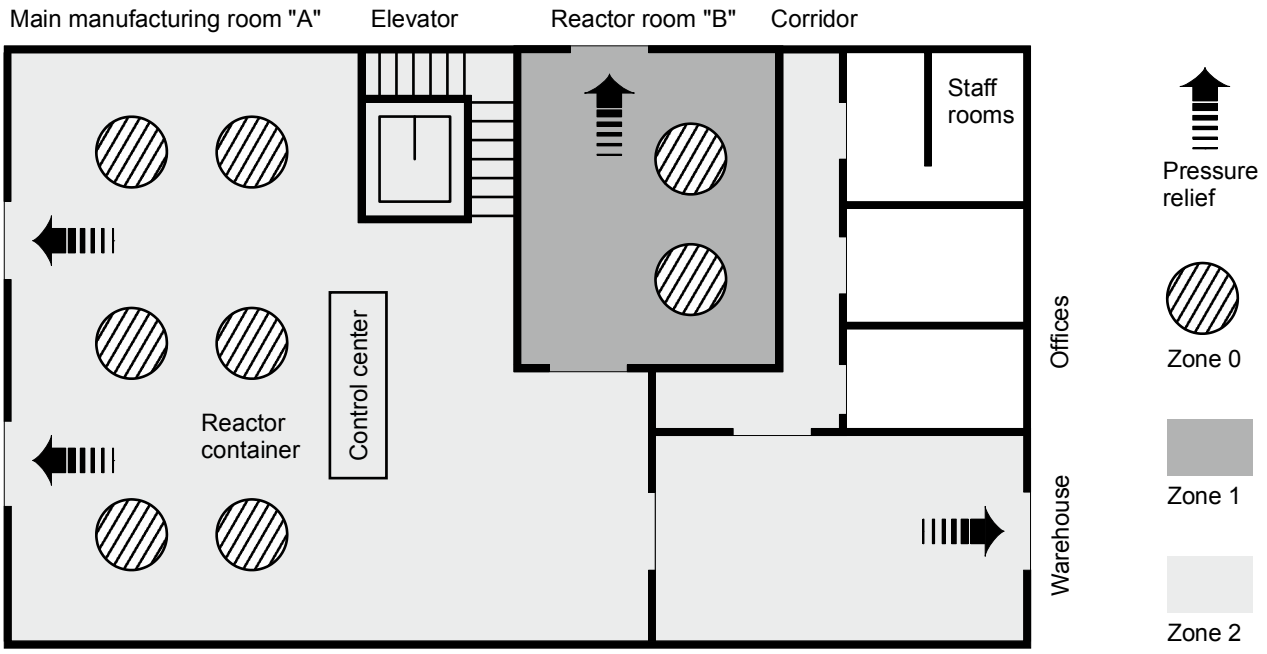
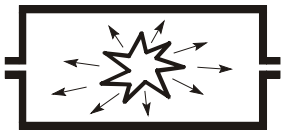
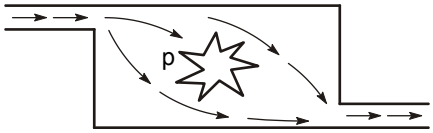
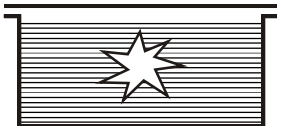
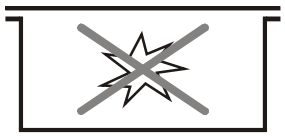
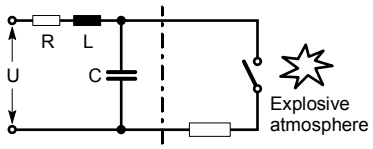


Fig. 1 Example of the classification of zones in a manufacturing building

5 Organizing electrical equipment by protection category (ignition protection category)

Nowadays it's common for a whole series of safety engineering to be used to solve safety problems in areas at risk of explosion. Each ignition protection category displays special benefits for particular device types and applications. The term ignition protection category means the measures which were taken during manufacture of the electrical equipment in order to render it ineffective as a source of ignition for ignition in an explosive atmosphere. The principle of isolating sources of ignition is used here. The following main ignition protection categories are currently standard in Europe for electrical equipment in zone 0,1 and 2 areas at risk of explosion:

Method/ignition protection category	**Symbol**	**Diagram**	**Application**
Pressure-resistant encapsulation	d		**Heavy current engineering:** (**Commutator) motors, transformers,** switchgear, lights, alarm devices and other parts which produce sparks
Overpressure encapsulation	p		As above, but for large devices in particular
Oil encapsulation Sand encapsulation Encapsulation	o q m		**Switchgear, transformers, capacitors** Encapsulated apparatus
Increased safety	e		**Squirrel-cage motors**, terminal and connection box, lights, current transformers, measurement and control devices
Intrinsic safety	i		**Low voltage engineering: Measurement and control devices** fire detectors, (equipment and operating circuits)
Ignition protection category "n_" EN 60079-15 UL 60079-15 IEC 60079-15 FM 3600	n		Electrical equipment is not able to ignite a surrounding explosive atmosphere (in normal operations and under defined abnormal operating conditions).

Tab. 1 Diagram and applications of ignition protection categories

5.1 Ignition protection category

5.1.1 Pressure-resistant encapsulation

"d" label

The parts which may ignite an explosive atmosphere are enclosed in a housing which withstands the pressure internally when a mixture explodes and which prevents the explosion from being transferred to the explosive atmosphere around the housing.

5.1.2 Overpressure encapsulation

"p" label

The parts at risk are enclosed in a housing where protective gas is subject to excess pressure which prevents an explosive atmosphere from arising.

5.1.3 Oil encapsulation

"o" label

The parts at risk are enclosed in oil such that an explosive atmosphere outside the oil cannot be ignited by the electric arc, sparks or hot gases occurring under the oil.

5.1.4 Sand encapsulation

"q" label

The parts at risk are surrounded by sand in a housing such that an explosive atmosphere cannot be ignited by either an electric arc or the production of heat.

5.1.5 Increased safety

"e" label

Special measures are taken to use an increased level of safety to prevent impermissibly high temperatures and the occurrence of sparks or electric arcs even within those items of equipment where they do not occur during normal operation. Appropriate measures are: Protection from bolts loosening themselves, large leakage and air gaps, protection from water and dust.

5.1.6 Intrinsic safety

"i" label

A circuit or part of a circuit is intrinsically safe if an explosive atmosphere cannot be ignited by a spark or another thermal influence with during normal operation or in the event of a fault.

Category "ia"

Safety is maintained should one single error arise or any combination of two errors arise. Appropriate equipment may be used in all danger zones 0,1 and 2.

Category "ib"

Safety is still maintained should an error arise. Appropriate devices may only be used in danger zones 1 and 2.

5.1.7 Encapsulation

"m" label

An ignition protection category where the parts which could ignite an explosive atmosphere (from sparks or heat) are embedded in a compound such that this explosive atmosphere cannot be ignited.

5.1.8 Ignition protection method "n"

Electrical equipment is not able to ignite a surrounding explosive atmosphere (in normal operations and under defined abnormal operating conditions).

5.2 Classification of electrical equipment into groups and classes

5.2.1 Application ranges

The electrical equipment for areas at risk of explosion is classified according to its usage conditions into:

Group I:

Electrical equipment for mining which may be put at risk by mine gas (methane/air mix).

Group II:

Electrical equipment for other operating sites where an explosive atmosphere may arise.

Operating sites are rooms or even open-air places where the term "room" doesn't always have to coincide with geometric dimensions. It may also be a zone or area, i.e. a larger, separate volume.

The I and II designations therefore stand for the application range.

5.2.2 Explosion groups and temperature classes

For the "d", "i", "nC" and "nL" ignition protection categories, electrical equipment of group II are split into IIA, IIB and IIC, as required in the corresponding standards for these ignition protection categories. The sub-division for pressure-resistant encapsulation is based on max. explosion-safe gaps (MESG).

For intrinsically safe electrical equipment, the sub-division for gases and steams is based on the ratios of their minimum ignition current (MIC) to the minimum ignition current of the lab methane.

For equipment which is ignition leakage-proof, like the pressure-resistant encapsulation (ignition protection category "d") there are always gaps. They occur mainly on housing parts, shafts and cable lead-throughs. A mixture capable of ignition can enter a device's housing in this way by the housing "breathing" and can be ignited by sparks or electric arcs. Appropriate design of the gap on the housing can prevent the ignition leakage of an explosion flame.

The gases and steams have been classified into groups and classes on the basis of test results using the key values established:

1) by their ability for ignition leakage through the gap into explosion groups IIA, IIB and IIC
2) by their ignition temperature into temperature classes T1 to T6

The table below contains examples for classifying gases and steams by explosion group and temperature class. This classification has allowed the design requirements of
equipment with explosion protection to be graded accordingly. The requirements increase through the digits 1, 2, 3 etc.
The manufacturer is therefore free to decide the requirements for which he wants to and
can build equipment with explosion protection.

	Temperature classes					
	T1	**T2**	**T3**	**T4**	**T5**	**T6**
Surface temperature in °C / **Explosion group**	450	300	200	135	100	85
I	Methane (firedamp)					
IIA	Ammonia, acetone, ethyl-acetate, benzene, carbon mon-oxide, methanol, propane	butane	Hexane, benzene, heating oils, diesel fuels	Di-ethyl ether, acetaldehyde		
IIB	City gas	Ethylene	Hydrogen sulfide			
IIC	Hydrogen	Acetylene				Carbon disulfide

Tab. 2 Examples of classification of gases and steams according to EN 60079-0 and temperature classes with maximum surface temperature of equipment

5.2.3 Labeling electrical equipment

In accordance with Directive 94/9/EC, Annex 2 (ATEX 95), IEC/EN 60079-0, Chapter 29.2, and the requirements of the certificates issued, each device must display at least the following details:

a) Name and address of manufacturer
b) Name of series and type
c) "Ex" symbol
d) Ignition protection category symbol (e.g. ib)
e) Group symbol (e.g. IIC)
f) Temperature class for group II (e.g. T4)

g) Series number
h) Name or code of approval body and certificate number (e.g. PTB 02 ATEX 2160)
i) CE label with code number of CE quality body
j) Year of construction
k) Special EX label
l) Symbol for device group (e.g. II)
m) Symbol for category (e.g. 2)
n) G (for device group II for areas where gases are present)

All equipment with explosion protection must also comply with certain temperature limits in order to prevent ignition from heated surfaces. Those parts of the housing or equipment which are subject to an explosive atmosphere must not exceed the surface temperatures stated.

Order of labeling	**1**	**2**	**3**	**4**	**5**
		Ignition protection category	**Use**	**Explosion group**	**Temperature class**
General label	**Ex**				
Ignition protection category					
– Pressure-resistant encapsulation		**d**			
– Sand encapsulation		**q**			
– Increased safety		**e**			
– Overpressure encapsulation		**p**			
– Oil encapsulation		**o**			
– Encapsulation		**m**			
– Intrinsically safe category ia		**ia**			
Category ib		**ib**			
Application range					
– Firedamp protection			**I**		
– Explosion protection			**II**		
Explosion group				**A**	
				B	
				C	
Temperature class					
– Surface temperature **450 °C**					**T1**
300 °C					**T2**
200 °C					**T3**
135 °C					**T4**
100 °C					**T5**
85 °C					**T6**

Tab. 3 Structure of labeling for equipment with explosion protection

6 Use of fire detectors in areas at risk of explosion

Fire detectors are mainly used in zone 1 and 2 areas at risk of explosion. Our products have therefore been designed for connection to intrinsically safe circuits – mainly category ib.

6.1 Principle of intrinsic safety (IEC 60079-11)

The IEC 60079-11 standard defines an intrinsically safe circuit as follows:
A circuit in which no sparks and thermal effects occur which could cause ignition of a particular explosive atmosphere under the test conditions defined in this standard (which cover normal operation and certain error conditions).
Within a system, corresponding protective measures must be taken to keep intrinsically safe and not intrinsically safe circuits separate from one another and to fulfill certain requirements.

6.2 Intrinsically safe installation (IEC 60079-14)

Areas at risk of explosion generally only cover a small part of a safety system. Control panels, terminals, and large parts of the system wiring can therefore be installed following the general valid rules, i.e. not intrinsically safe. They must be installed outside the ex area.
However inside the area at risk of explosion, the supply network plus all equipment must be designed to be intrinsically safe.
The physical division between not intrinsically safe and intrinsically safe system components takes the form of safety barriers which limit the voltage, current and power in the intrinsically safe circuit to safe values.
A distinction is made between:
– ib category safety barriers which can only be used for zones 1 and 2
– ia category safety barriers which can be used for zones 0, 1 and 2
An equipotential bonding conductor is usually needed for areas at risk of explosion. All larger, touchable, conductive design parts, safety barriers, cable shields etc. must be connected to this.
The ground point of the safety barriers (Zener barriers) must be linked to the equipotential bonding using the shortest route possible.
If shielded cables are used, the shield should be connected with the equipotential bonding on one side.

Grading the risk of explosion	Equipment labeling needed	
	Device group	Category
Zone 0	II	1 G
Zone 1	II	2 G or 1 G
Zone 2	II	3 G or 2 G or 1 G

Tab. 4 Grading the risk of explosion

6.3 Ex-products for fire detector lines

The 6.3.1 and 6.3.2 product ranges correspond to intrinsic safety "i" but only if using an approved safety barrier as detailed below:
- $R_S \geq 280$ Ohm
- $U_0 \leq 28$ V
- $I_0 \leq 100$ mA

- $P_0 \leq 700$ mW

6.3.1 Product range

Product / device	IMK	KMK	Labeling		Detector line		AI line	
			Category ATEX	Ignition protection category	C_i	L_i	C_0	L_0
Smoke detector DO1101A-Ex	**–**	**1.6**	**II 2 G**	**Ex ib IIC T4 (-25 °C ≤ T_a ≤ 60 °C)**	**≤ 1 nF**	**–**	**≤ 33 nF**	**≤ 1.6 mH**
Thermo differential detector DT1101A-Ex	**–**	**1**	**II 2 G**	**Ex ib IIC T4 (-25 °C ≤ T_a ≤ 50 □)**	**≤ 1 nF**	**–**	**≤ 33 nF**	**≤ 1.6 mH**
Thermo differential detector DT1102A-Ex	**–**	**1**	**II 2 G**	**Ex ib IIC T4 (-25 °C ≤ T_a ≤ 70 °C)**	**≤ 1 nF**	**–**	**≤ 33 nF**	**≤ 1.6 mH**
Neural smoke detector DOT1151A-Ex	**1**	**–**	**II 2 G**	**Ex ib IIC T4 (-25 °C ≤ T_a ≤ 70 °C)**	**≤ 1 nF**	**–**	**≤ 33 nF**	**≤ 1.6 mH**
Thermo differential detector DT1151A-Ex	**1**	**–**	**II 2 G**	**Ex ib IIC T4 (-25 °C ≤ T_a ≤ 70 °C)**	**≤ 1 nF**	**–**	**≤ 33 nF**	**≤ 1.6 mH**
Multi-sensor fire detector FDOOT241-A9-Ex	**-**	**1.25**	**II 1 G**	**Ex ia IIC T4 (-35 °C ≤ T_a ≤ 70 °C)**	**< 0.2 nF**	**-**	**< 38 nF**	**< 0.1 mH**
Multi-sensor fire detector OOH740-A9-Ex	**-**	**1.25**	**II 1 G**	**Ex ia IIC T4 (-35 °C ≤ T_a ≤ 70 °C)**	**< 0.2 nF**	**-**	**< 38 nF**	**< 0.1 mH**
Flame detector DF1101-Ex	**–**	**6**	**II 2 G**	**Ex ib IIC T4 (-25 °C ≤ T_a ≤ 70 °C)**	**≤ 5 nF**	**≤ 10 µH**	**≤ 33 nF**	**≤ 1.6 mH**
Flame detector DF1151-Ex	**3**	**–**	**II 2 G**	**Ex ib IIC T4 (-25 °C ≤ T_a ≤ 70 °C)**	**≤ 5 nF**	**≤ 10 µH**	**≤ 33 nF**	**≤ 1.6 mH**
Manual call point DM1153-Ex	**1**	**–**	**II 2 G**	**Ex ib IIC T4 (-25 °C ≤ T_a ≤ 70 °C)**	**≤ 1 nF**	**–**	**–**	**–**
Manual call point DM1154-Ex	**1**	**–**	**II 2 G**	**Ex ib IIC T4 (-25 °C ≤ T_a ≤ 70 °C)**	**≤ 1 nF**	**–**	**–**	**–**
Manual call point DM1153H-Ex	**1**	**–**	**II 2 G**	**Ex ib IIC T4 (-25 °C ≤ T_a ≤ 70 °C)**	**≤ 1 nF**	**–**	**–**	**–**
Manual call point DM1154H-Ex	**1**	**–**	**II 2 G**	**Ex ib IIC T4 (-25 °C ≤ T_a ≤ 70 °C)**	**≤ 1 nF**	**–**	**–**	**–**

Tab. 5 Overview table of Ex apparatus

When calculating the maximum length of the lines, the AI line can be considered independently of the detector line. A maximum of one alarm indicator is permitted for each detector.

The typical values for cables are:
100 m standard cable, twisted: 10 nF/100 µH
100 m shielded cable: 14 nF/100 µH
The actual values for the cable used must be used in the calculation.

C_i = effective internal capacity of the equipment
L_i = effective internal inductivity of the equipment
C_0 = maximum permissible external capacity in the intrinsically safe circuit
L_0 = maximum permissible external inductivity in the intrinsically safe circuit

KLK = Collective line code = 25
KMK = Load code for collective/limit value elements
ILK = Interactive line code = 128
IMK = Load code for interactive elements
Other apparatus specifications can be found in the corresponding technical data or product sheets.

6.3.2 "Simple apparatus" (standard products) product range corresponds to EN 60079-11, section 5.7

Equipment with simple and clear circuits (e.g. end-of-lines), LEDs, simple manual call points) are known as simple electrical equipment or "simple apparatus" according to EN 60079-11 § 5.7.
"Simple apparatus" do not have their own sources of ignition. They are not therefore subject to the ATEX directive (EU Directive 94/4/EC, Art. 1, Para. 3). They do not therefore need a certificate of conformity, do not have to be tested by a notified body and do not have to be labeled. On the other hand, they must not represent sources of ignition (e.g. due to heating, sparks, static discharge).

Product / device		Item number	Report / classification / comments
Manual call point	**DM1101** [1) 2)]	**BPZ:4577630001**	**Ex ib IIC T4 (≤ 70 °C)** **Attach** *"avoid electrostatic charging"* **sticker!**
Manual call point	**DM1103** [1) 2)]	**A5Q00004470**	**Ex ib IIC T4 (≤ 70 °C)** **Attach** *"avoid electrostatic charging"* **sticker!**
Manual call point	**DM1104** [1) 2)]	**A5Q00005925**	**Ex ib IIC T4 (≤ 70 °C)** **Attach** *"avoid electrostatic charging"* **sticker!**
Manual call point	**AT50** [1)]	**BPZ:3951680001**	**Ex ib IIC T4 (≤ 40 °C)** **Attach** *"avoid electrostatic charging"* **sticker!**
End-of-line (Ex)	**EOL22 (Ex)** [2)]	**BPZ:5162220001**	**Ex ib IIC T4 (≤ 70 °C)** **Must be fitted in housing ≥ IP20!**
Base	**DB1101A**	**BPZ:4863650001**	**Ex ib IIC T4 (≤ 80 °C)** **Only together with detector DS1100-Ex!**
Base	**DB1151A**	**BPZ:4863780001**	**Ex ib IIC T4 (≤ 80 °C)** **Only together with detector DS1100-Ex!**
Base	**SPF600**	**S24218-F400-A1**	**Ex ib IIC T4 (≤ 80 °C)**
Base	**FDB201**	**A5Q00003814**	**Ex ia IIC T4 (≤ 80 °C)** **Only together with detector FDOOT241-A9-Ex or OOH740-A9-Ex!**
Base	**FDB202**	**S54319-F3-A1**	**Ex ia IIC T4 (≤ 80 °C)** **Only together with detector FDOOT241-A9-Ex or OOH740-A9-Ex!**
Base attachment	**DBZ1191**	**BPZ:4540830001**	**Ex ib IIC T4 (≤ 80 °C)**
Base attachment	**DBZ1191A-AA**	**BPZ:4540830001**	**Ex ib IIC T4 (≤ 80 °C)**
Base attachment	**DBZ1192**	**BPZ:4588140001**	**Ex ib IIC T4 (≤ 80 °C)**
Base adapter	**DBZ1196**	**BPZ:4788650001**	**Ex ib IIC T4 (≤ 80 °C)** **Only together with detector DB1101-A and ex-detector DS1100-Ex!**

Alarm indicator	**DJ1191 Ex** [2) 3)]	**BPZ:4783440001**	**Ex ib IIC T4 (≤ 80 °C) (no longer available)**
Alarm indicator	**FDAI92-Ex** [2) 3)]	**S54370-F4-A1**	**Ex ib IIC T4 (≤ 80 °C) (replacement for DJ1192 Ex)**
Alarm indicator	**FDAI93-Ex** [2) 3)]	**S54370-F6-A1**	**Ex ib IIC T4 (≤ 80 °C) (replacement for AJUT24 Ex)**
Base	**DFB1190**	**BPZ:5165360001**	**Only together with detector DF1101-Ex and ex-detector DF1151-Ex!**
Base	**DFB1190-AA**	**BPZ:5227400001**	**Only together with detector DF1101-Ex UL/ULC!**
Mounting bracket	**MV1**	**BPZ:3950450001**	**Only together with base Z2406 or DFB1190 and the corresponding detector!**
Ball and socket joint	**MWV1**	**BPZ:3674840001**	
Rain hood	**DFZ1190**	**BPZ:5302660001**	**Only together with base DFB1190 and detector DF1101-Ex or DF1151-Ex**
Sticker		**BPZ:5358470001**	***"avoid electrostatic charging"***

Tab. 6 "Simple apparatus" product range

[1)] Electric charge: The housing is made from plastic and has a surface resistance of > 1 GΩ. There is therefore a risk of electrostatic discharge. It must not be cleaned with solvents. The words "avoid electrostatic charging" (sticker item no. BPZ:5358470001) must be attached in a place where it can be easily seen when the device is mounted.

[2)] Is only intrinsically safe when using an approved safety barrier with the data: $R_S \geq 280\ \Omega$, $U_0 \leq 28$ V, $I_0 \leq 100$ mA, $P_0 \leq 700$ mW.
Contains no energy store and no energy sources. Only contains components with a surface which is larger than 20 mm² and smaller than 10 cm².
Therefore § 5.7 of EN 60079-11 (Simple electrical equipment) and § 5.6.2 of EN 60079-11 (Temperature for small components, Tab. 7), apply:

Total surface, not including connection wires	**Group II T4**	**Group I**
		Dust excluded
	Maximum surface temperature [°C]	Maximum surface temperature [°C]
< 20 mm^2	275	950
≥ 20 mm^2 and ≤ 10 mm^2	200	450
> 10 mm^2	135	450

Tab. 7 Evaluation for temperature classification by component size and ambient temperature (§ 5.6.2 of EN 60079-11)

Power dissipation less than 1 W at a max. ambient temperature of 80 °C. The max. power dissipation of every single component cannot be greater than the 0.7 W supplied by the safety barrier. Every single component is therefore intrinsically safe.

[3)] Maximum: 1 external alarm indicator permitted per detector

6.4 Alarm devices for Ex areas

Product / device	Ignition protection category	**Alarm device cable** **Max. permissible external capacity/inductivity**
Alarm device DB3	[Exd] IIC T5	– –

Tab. 8 Alarm devices for Ex areas

6.5 Extra devices (not subject to the Ex directives)

Product / device		**ILK**	**KLK**
Housing for SB2 / SB3 installation set for SB2 / SB3 housing for MTL5021/SB3	DCA1191 Z3I410 DCA1191-AB	**–** **–** **–**	**–** **–** **–**
Input/output module (line coupler)	DC1192	–	25
Line interface	E3M171	32	–
Transponder	FDCIO223	-	32
Zone module, external powered	FDCI223/FDCI723	-	32

Tab. 9 Extra devices

7 Technical data

7.1 Safety barrier SB3

The safety barrier SB3 is, according to approval
PTB 01 ATEX 2088,
approved for the following classification:
II (1/2) G D [Ex ia/ib] IIB / IIC

Polarity –	**Functional data**	**Maximum safety engineering values**					
	U_N: Nominal operating voltage	P_0: Maximum power U_0: Maximum voltage I_0: Maximum current C_0: Max. permissible external capacity L_0: Max. permissible external inductivity R_S: Safety engineering resistance					
Type	U_N [V]	P_0 [W]	U_0 [V]	I_0 [mA]	R_S [Ω]	L_0 [mH] IIC	C_0 [nF] IIC
SB3 (steel 9001/00-280-100-101)	-24	0.7	28	100	280	1.6	83

Tab. 10 Safety barrier SB3

7.2 Safety barrier SB2

The safety barrier SB2 is, according to approval
PTB 01 ATEX 2053
approved for the following classification:
II (1/2) G D [Ex ia/ib] IIB / IIC

Polarity +, + (diode)	**Functional data**						**Maximum safety engineering values**							
	U_N: Nominal operating voltage I_m: Maximum current through safety barriers R: Typical lengthwise resistance ΔU_{max}: Maximum permissible voltage drop						P_0: Maximum power U_0: Maximum voltage I_0: Maximum current C_0: Max. permissible external capacity L_0: Max. permissible external inductivity R_S: Safety engineering resistance							
Type	Chan-nel	U_N [V]	I_{max} [mA]	R [Ω]	R+ [Ω]	ΔU_{max} [V]	P_0 [W]	U_0 [V]	I_0 [mA]	R_S [Ω]	L_0 [mH] IIC	L_0 [mH] IIB	C_0 [µF] IIC	C_0 [µF] IIB
SB2 (steel 9002/13-280-093-001)	1	+24	67	340	19	-	0.63	28	90	313	2.2	14	0.08	0.65
	2	+24	-	-	-	2	-	28	3	-	50	150	0.08	0.65
	1 + 2						0.65	28	93	313	2	13	0.08	0.64

Tab. 11 Safety barrier SB2

7.3 Alarm device DB3

		Type: DB3
Ex classification		Ex d IIC T5
Voltage	U_{max}	DC 48 V
Current	I_{max}	380 mA
Capacitance	$C_{eq.}$ [µF]	Ø
Inductance	L_{eq} [mH]	Ø
Ambient temperature	T_a	-20 °C to +55 °C
Sound level	at 24 V/m	depends on sound pattern 101…115 dB(A)
Approval	BASSEFA	BAS00ATEX2097X

Tab. 12 Alarm device DB3

You will find the technical data for the various fire detector types in the corresponding technical specifications.

8 Guidelines for installing fire detection installations (BMA) in areas at risk of explosion

8.1 General

The general planning of fire detection installations also applies to Ex areas.

This document only addresses Ex-specific points.

Specific national requirements always apply as the basis for creating installations in areas at risk of explosion.

These guidelines are based on Siemens' specific and long-standing experience of building fire detection installations and the European standards on which these guidelines are based.
The relevant local authorities (in Switzerland, the fire authority for the canton and SUVA) determine whether areas are at risk of explosion and the severity of the risk.
A zone plan should be requested of the bodies responsible. This should detail areas 0 / 1 / 2 and the areas not at risk. This body should also state the corresponding solvent or gas and the T1...T6 temperature class assigned to it, incl. groups IIA, IIB or IIC.
These details are needed to plan the installations and order the materials.

8.1.1 Electrical isolation in limit value fire detection system

The **DC1192, Transponder FDCIO223** input/output module is used for the electrical isolation between control panels and safety barriers.
The MLK20 detector line coupler has been replaced by the DC1192 input/output module. The MLK20 detector line coupler may however still be used in existing sites.

8.1.2 Installation guidelines

Cables may only be laid in rooms at risk of explosion if they are used in the systems located in these rooms.
Recess-mounted cables which are fully laid in concrete may be guided through the Ex area.
After the safety barriers, only apparatus according to sections 6.3 and 6.4 may be used.
If an external alarm indicator (AI) is installed outside the Ex area, a return barrier is usually also required. In some countries (e.g. Switzerland) barriers are not needed if the AI is installed on the wall to the Ex room.

Lead-throughs from Ex rooms to non-Ex rooms must be gas-tight (detector lines and AI cables).
Cables and pipes must be clearly labeled in accordance with the specification for intrinsically safe installations at points where the direction changes and where they enter the apparatus. Recommendation: Use "bright blue". Bright blue glue points or bright blue insulating tape can also be used.

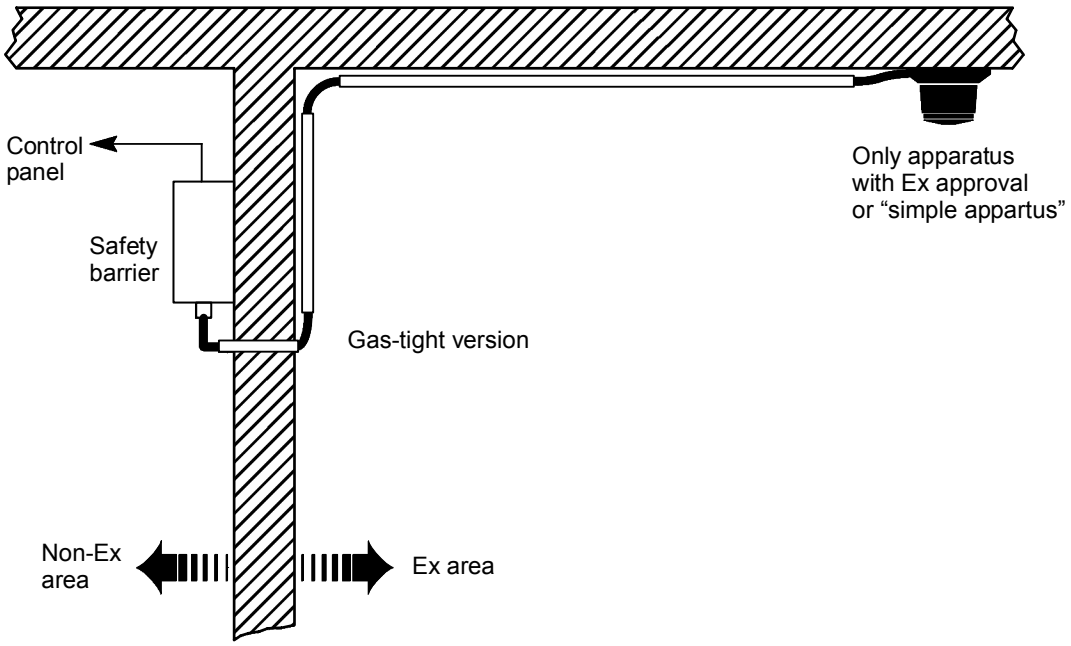


Fig. 2 Example of installation

8.1.3 Selecting materials for ex-zones 0, 1 and 2

Installation materials
Only installation materials which correspond to the national guidelines may be used in rooms at risk of explosion.
We only recommend plastic pipes labeled as "flame retardant" for installing fire detection installations. If metal pipes are laid, these should be connected to the equipotential bonding.
Country-specific, standard cables and installation materials can usually be used.

8.1.4 Protective spacing for rooms at risk of explosion

The national specifications determine the size of protective spacing for electrical apparatus at door and ventilation openings in rooms at risk of explosion. If there are no such specifications, we recommend:
The apparatus which are fitted in the area not at risk must be at least one meter away (on all sides) from door openings and other openings to Ex rooms.
Only Ex-approved apparatus may be fitted within this minimum spacing.
The body responsible must enter the protective spacing when producing the zone plan.
The safety barrier must always be fitted in the area not at risk (note protective spacing).

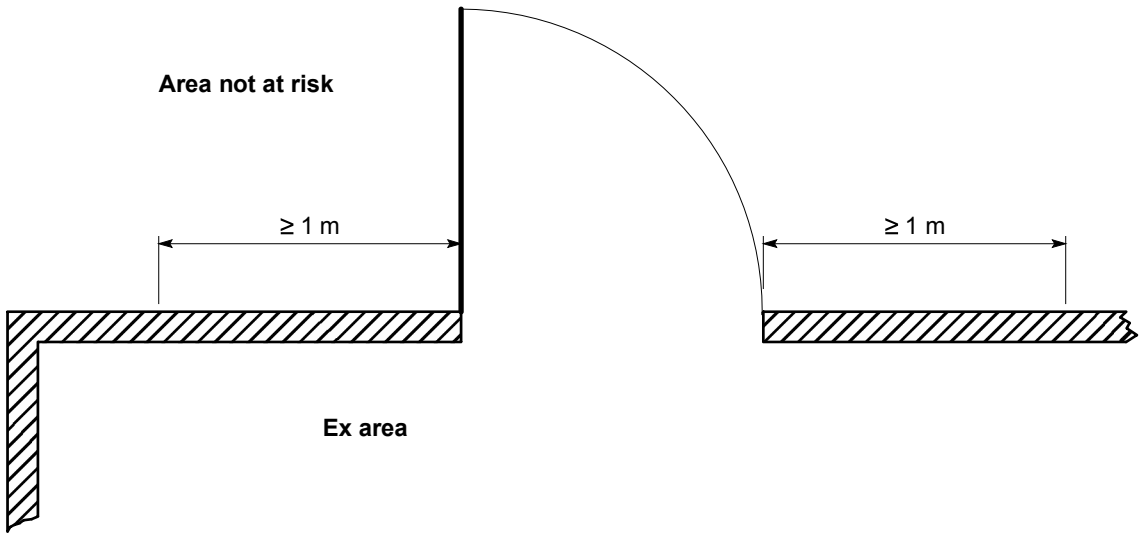


Fig. 3 Minimum spacing between doors/openings to ex-rooms for apparatus in area not at risk

8.2 Equipotential bonding

In areas at risk of explosion, systems and system parts made from metal must be connected to the equipotential bonding. Whether an appropriate equipotential bonding is present must be established before the start of installation. If there is no such equipotential bonding, the project planner responsible must ask the site owner to rectify this deficiency. The equipotential bonding should be grounded following national guidelines.

The equipotential bonding is a interconnection between local water pipe, foundations grounding device, lightning protection system, water pipe, ventilation pipes, heating pipes, metal installation pipes, larger solid metal objects such as cylinders, frames and the grounded conductor when zeroing according to Fig. 4.

The cross-section for this equipotential bonding must correspond to the national guidelines.

The pipe connection parts (sleeves etc.) for water pipes, pipes for sprinkler systems and dry extinguishing systems must be screwed down with tools such that full, metal contact between the threads is ensured.

Pipe screw connections in which at least 5 thread turns are made satisfy these requirements provided that the conductivity is not restricted by the seal material being of say hemp, Teflon etc.

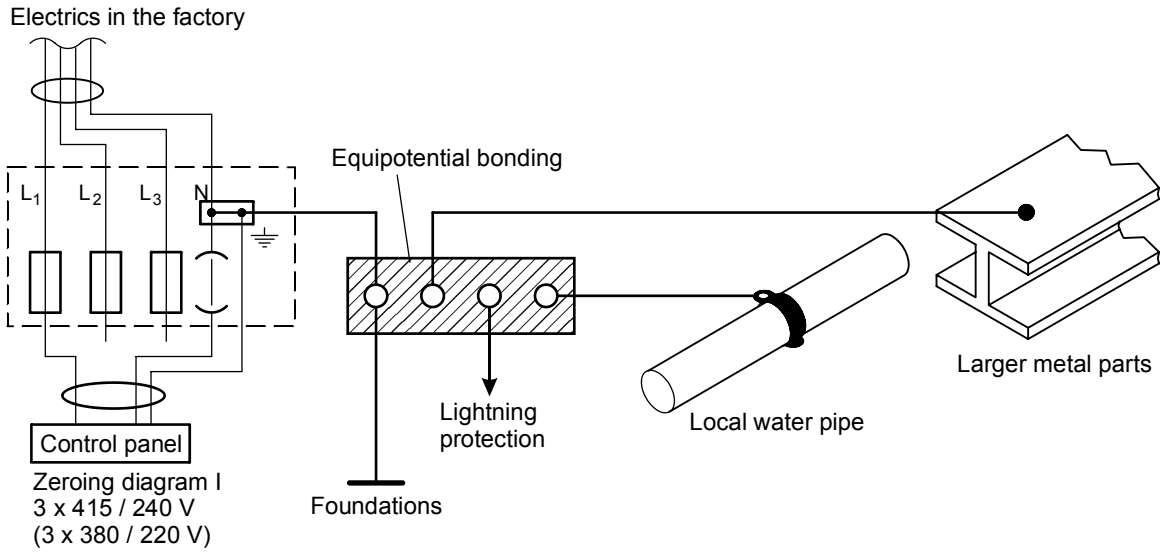


Fig. 4 Equipotential bonding grounding (example)

8.3 "Intrinsic safety i" ignition protection category - intrinsically safe circuits

The principle of this protection category is that the equipment which is activated in these kinds of circuits is not able to cause an ignition in the event of an error.

A safety barrier before the Ex area gives the following circuit intrinsic safety.

8.3.1 Principle of intrinsically safe circuit with SB3 safety barrier

In order to prevent equalizing currents between various equipotential bonding grounds and the control panel, a input/output module DC1192 or a transponder FDCIO223 for electrical isolation between the fire control panels and SB3 safety barrier must be switched to de-couple the detector lines in the collective fire detection system.

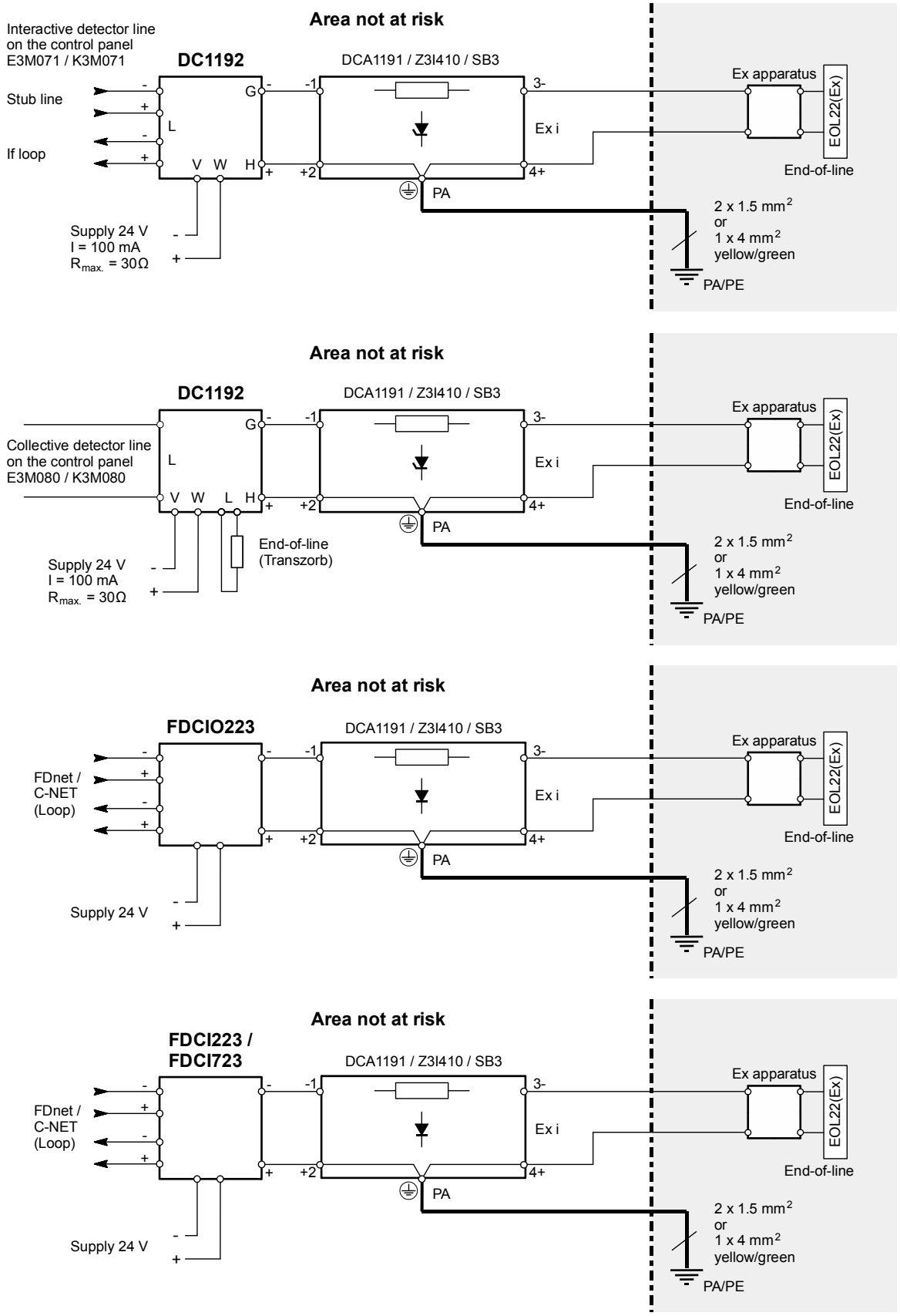


Fig. 5 Principle of intrinsically safe circuit with SB3 safety barrier

	Warning!	The detector line capacity, including apparatus, must not exceed 83 nF and 1.6 mH after the safety barrier SB3!

8.3.2 Basic circuit of SB3 safety barrier

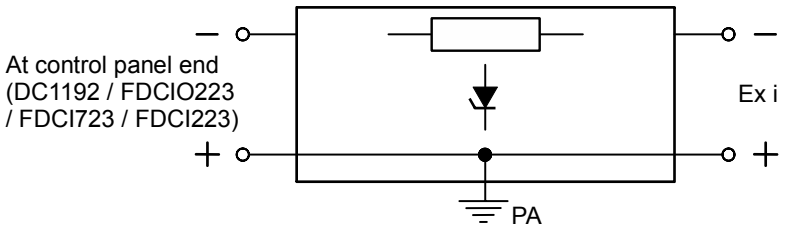


Fig. 6 Diagram showing principle of negative single SB3 safety barrier

8.4 Principle of intrinsically safe circuit with two-channel SB2 safety barrier

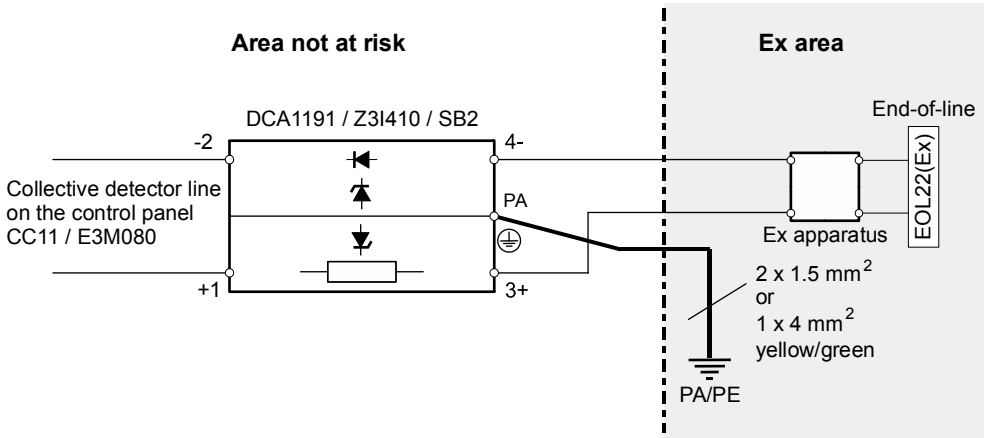


Fig. 7 Diagram showing principle of intrinsically safe circuit with SB2

Warning!	The detector line capacity, including apparatus, must not exceed **80 nF** after the SB2 safety barrier!

8.5 Activation of acoustic alarm device DB3

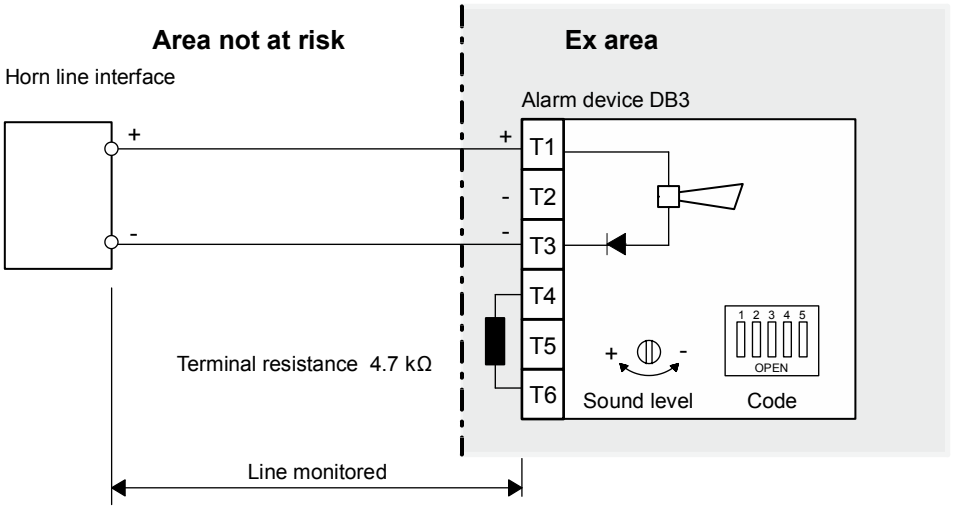


Fig. 8 Activation of acoustic alarm device DB3

8.6 Activation of DC1192A input/output module

Observe the following when activating the input/output module DC1192A:

- For further information, see document 1519

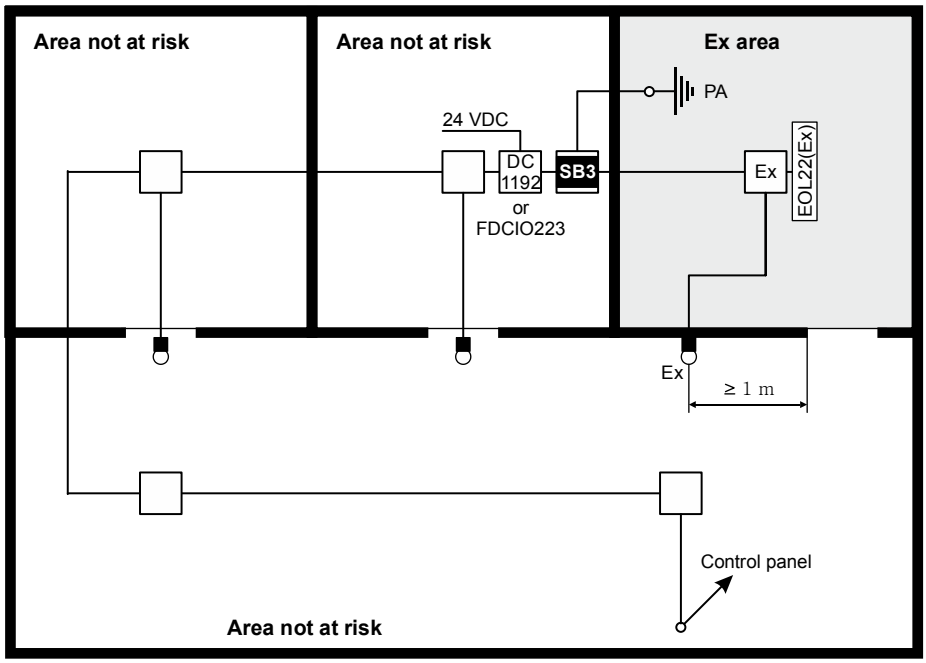
9 Installation

9.1 Conditions for installation

Installation after the safety barriers, with or without shielded cable, must be undertaken as a cable labeled (bright blue) as intrinsically safe (IEC 60079-14).
The intrinsically safe (bright blue) cable must be routed separately from the other, not intrinsically safe cables (IEC 60079-11).

The circuits in the intrinsically safe cable must not be connected to one another.

Only intrinsically safe circuits may be routed in the distribution boxes. The connection parts in the distribution boxes must have spacing of at least 6 mm and be labeled as intrinsically safe (IEC 60079-11).



Fire detector
Ex fire detector
Alarm indicator
SB3 Evaluation barrier

Fig. 9 Example of a fire detection installation which extends into an Ex area

Transponder FDCIO223/Zone module FDCI223, FDCI723
Accessories:
- Input/output modules FDCIO223/FDCI223/FDCI723 for electrically isolating the detector line or triggering an alarm device
- DCA1191 housing for SB3 safety barrier
- Z3I410 SB3 installation kit with DCA1191

Installation after the safety barriers, with or without shielded cable, must be undertaken in accordance with local specifications.

9.2 Installation material

Pipes:	PVC basis, flame retardant Metal pipes
Cable:	Standard cable with solid conductor, min. □ 0.6 mm Cable shielded with solid conductor, min. □ 0.6 mm
Apparatus:	Normal version in area not at risk before the safety barrier Only apparatus with Ex approval after the safety barrier in the Ex area.
Safety barriers for fire detector lines:	SB3 (steel 9001/00-280-100-101) Additional: Steel 9001/00280-085-10 MTL 728 negative STL E85 negative SB2 (steel 9002/13-280-093-001)
Accessories:	Input/output module DC1192 or transponder FDCIO223 or zone modules FDCI223/FDCI723 for electrically isolating the detector line or triggering an alarm device
	DCA1191 housing for two SB2 / SB3 safety barriers
	Z3I410 SB3 installation kit for SB2 / SB3 with DCA1191
	DCA1191-AB housing for 2 SB3

Tab. 13 Installation material

9.3 Installation specifications

9.3.1 Fire detection and control lines

- Safety barriers (SB) should be positioned as directly in front of the Ex area as possible. SB and non-Ex-installations must however be fitted at least 1 m away from door and ventilation openings.
- If safety barriers have to be fitted further away, the cables after the safety barrier should be labeled as specified for that country. Connect the safety barrier ground directly to the equipotential bonding ground with at least with at least 4 mm^2.
- The equipotential bonding ground must be ensured throughout the fire detection area.

9.3.2 Alarm indicator

- The external alarm indicator is fitted outside the Ex room without return barriers, directly on the wall to the Ex room. A return barrier is needed for larger distances or if differing guidelines apply in that country.
- Several detectors must not be connected to one external alarm indicator.

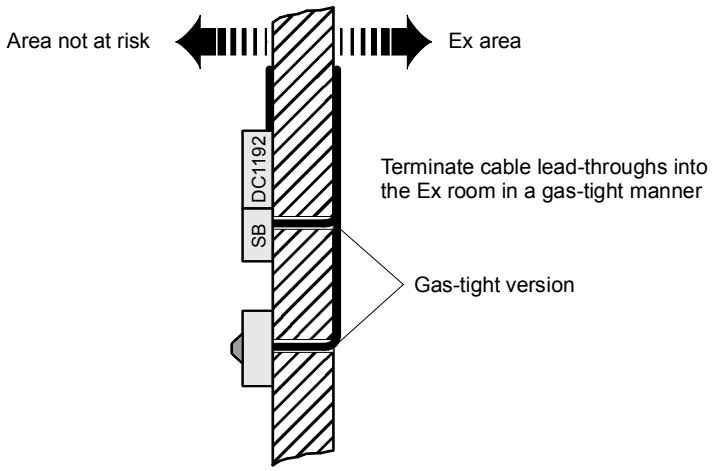


Fig. 10 Example of assembling an external alarm indicator

9.3.3 Input/output module DC1192

When using input/output module DC1192, the following should be noted:

- For further information, see document 1519

9.3.4 Transponder FDCIO223

When using transponder FDCIO223, the following should be noted:

- For further information, see document 009168

9.3.5 Zone modules FDCI223/FDCI723

When using zone modules FDCI223/FDCI723, the following should be noted:

- For further information, see document A6V10414906 (FDCI223) or A6V10414910 (FDCI723)

9.3.6 Grounding (fire detection and control lines)

- The ground pin of the safety barrier must be connected to the equipotential bonding. The ground conductor cross-section from the safety barrier to the equipotential bonding must correspond to country-specific requirements.
- When using shielded cables, the shieldings must be linked from one detector to the next.
- Only ground shielding at one end on the equipotential bonding.
- Ground metal housings of fire detectors via cable shielding or separately on equipotential bonding.
- The equipotential bonding rail must always be in the ex-area.

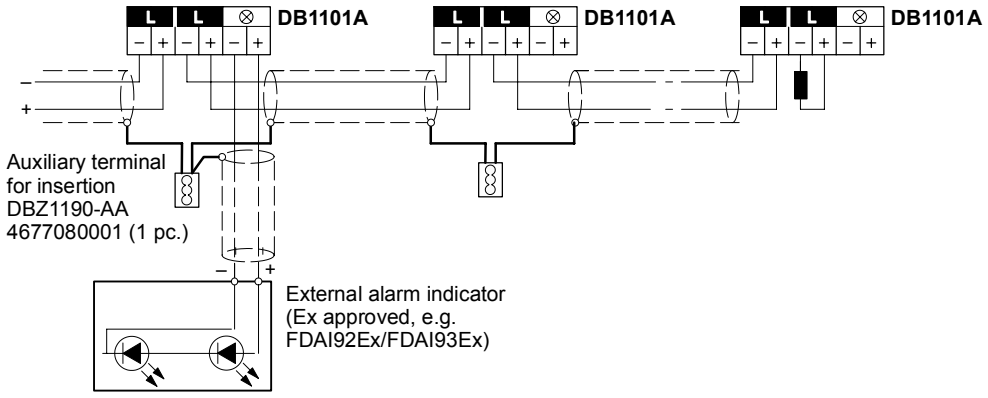


Fig. 11 Use of shielded cables on sample smoke or heat detector

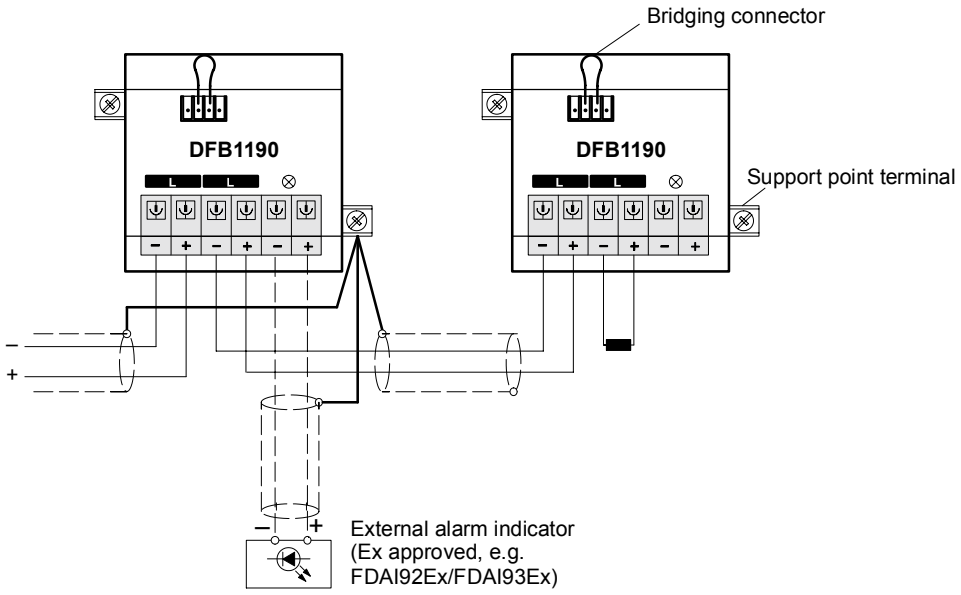


Fig. 12 Use of shielded cables on sample flame detector

9.3.7 Ground potential differences (collective fire detection lines)

Sometimes considerable differences in voltage occur between different ground points (equipotential bonding ground, power line ground) and these may impact on system functions.

Applications with input/output module DC1192
Using DC1192 produces an electric isolation between the safety barrier and fire detection system.
This prevents ground potential differences in voltage and resultant equalizing currents.

Applications without input/output module DC1192
If the DC1192 is not used in certain cases, residual risks are not excluded.

The following points should be observed for all cases:

1. Only permissible with CC11/E3M080, line type 3
2. Use SB2 two-channel safety barrier only
3. Ground fault monitoring isolation is needed
4. Just one Ex area with one safety barrier per system
- Ground potential differences in voltage between control panel and SB2 < 20 V
- The equipotential bonding and control panel ground must be in the same building

Several SB3 per system:
Same ground potential for all safety barriers and all parts of the fire detection system.

Recommendation: Use of DC1192 / SB3 combination.

9.3.8 Ground fault monitoring (limit value fire detection lines)

Only DC1192/SPF3500 may be used when using control panels with permanently integrated ground fault monitoring.
If the ground fault monitoring can or needs to be isolated off in the control panel, you may work without the DC1192 under the conditions outlined above.

9.4 Examples of installation

The maximum line load in terms of capacity and inductivity relates to the IIC explosion group.
When using SB3, the DCA1191 housing and Z3I410 installation kit are always needed.

9.4.1 Collective fire control panels, DC1192 in front of Ex area

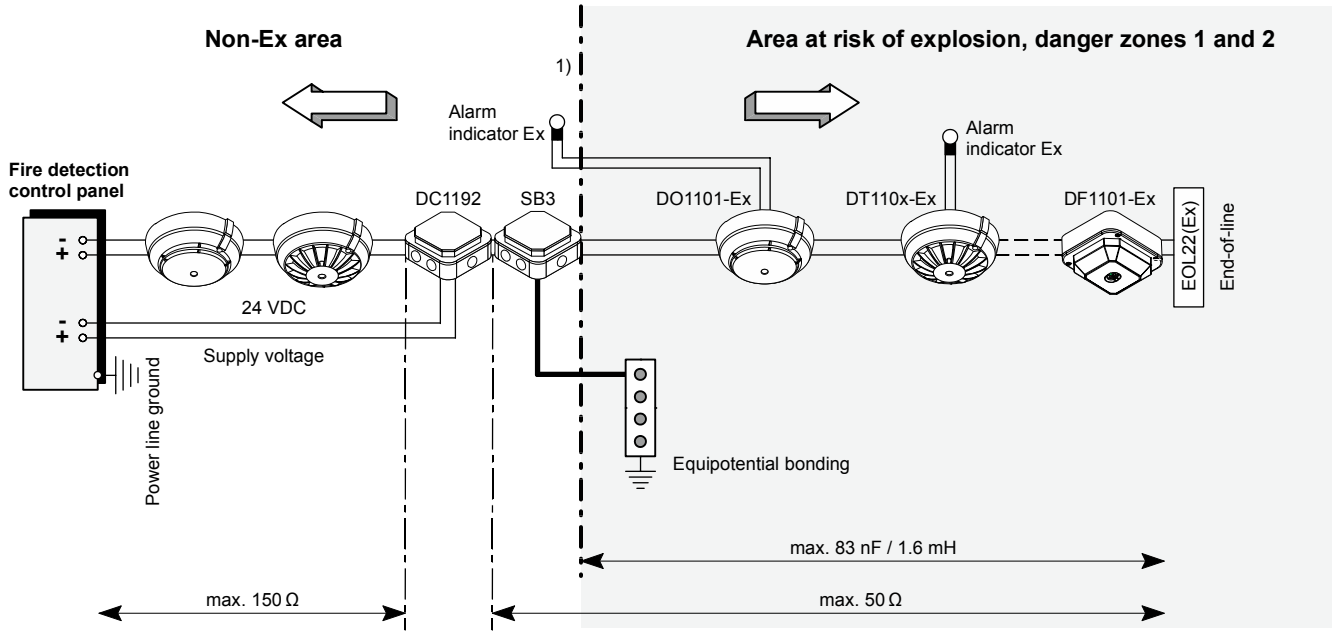


Fig. 13 Collective fire control panels, DC1192 in front of Ex area

[1] depending on specification, a return barrier may be needed, see chapter 9.3.2

9.4.2 Collective fire control panels, DC1192 with control panel

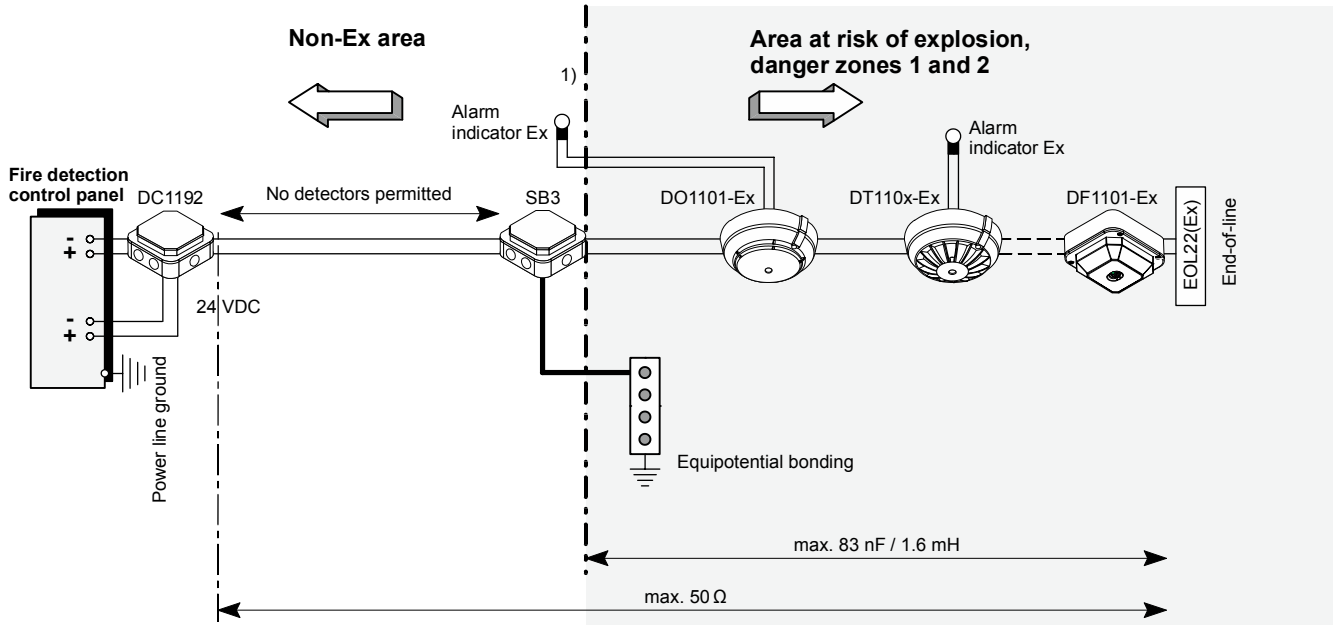


Fig. 14 Collective fire control panels, DC1192 with control panel

[1] depending on specification, a return barrier may be needed, see chapter 9.3.2

9.4.3 MS9i addressable, DC1192 in front of Ex area (Ex area collective detector)

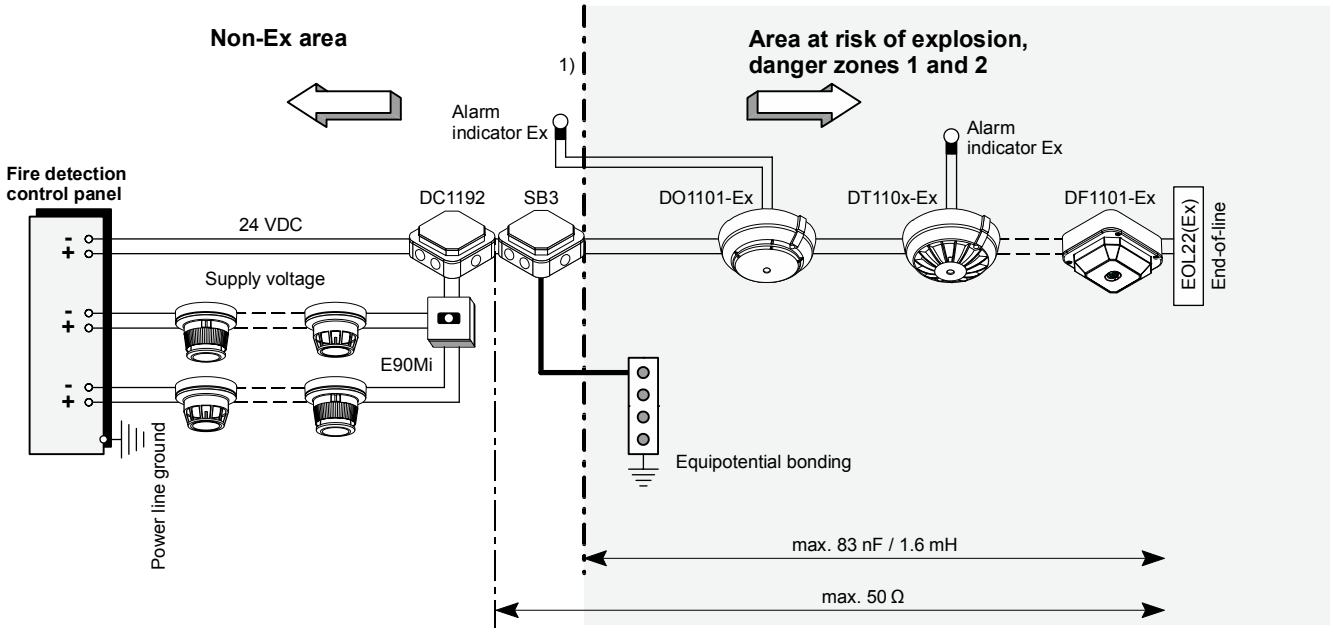


Fig. 15 MS9i addressable, DC1192 in front of Ex area

[1] depending on specification, a return barrier may be needed, see chapter 9.3.2

9.4.4 MS9i addressable, DC1192 with control panel (after DC1192 collective detector)

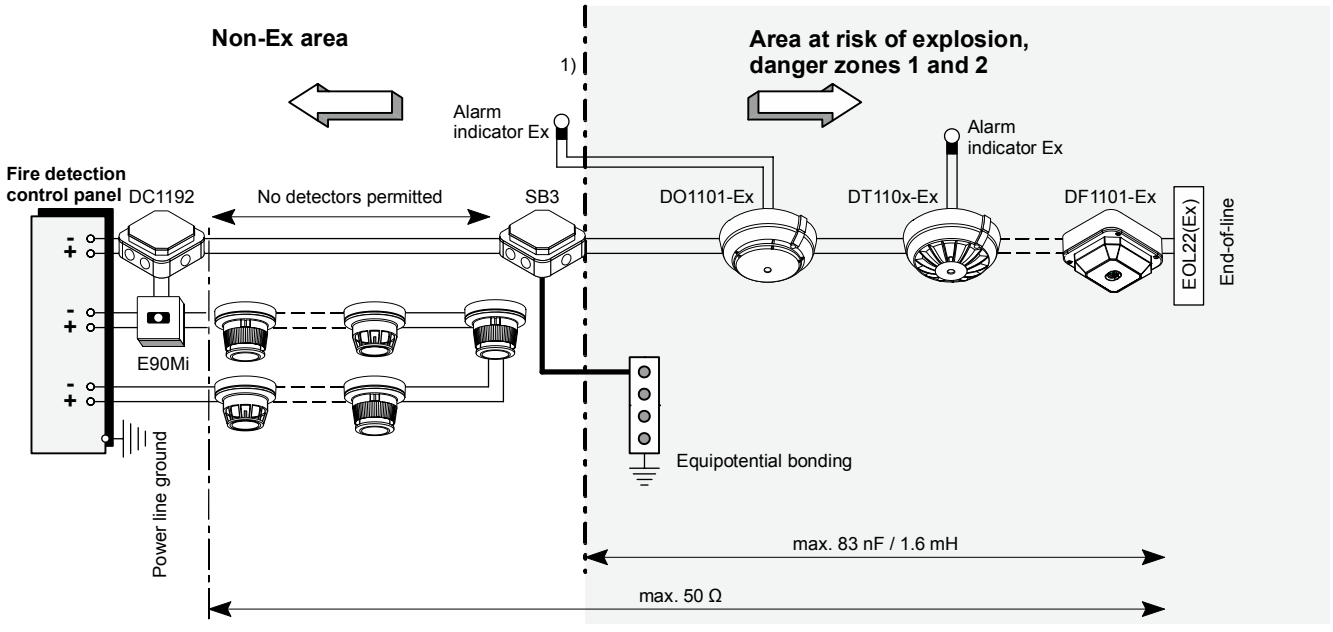


Fig. 16 MS9i addressable, DC1192 with control panel

[1] depending on specification, a return barrier may be needed, see chapter 9.3.2

9.4.5 CS1140 interactive (in front of EP5) (in Ex area collective detector)

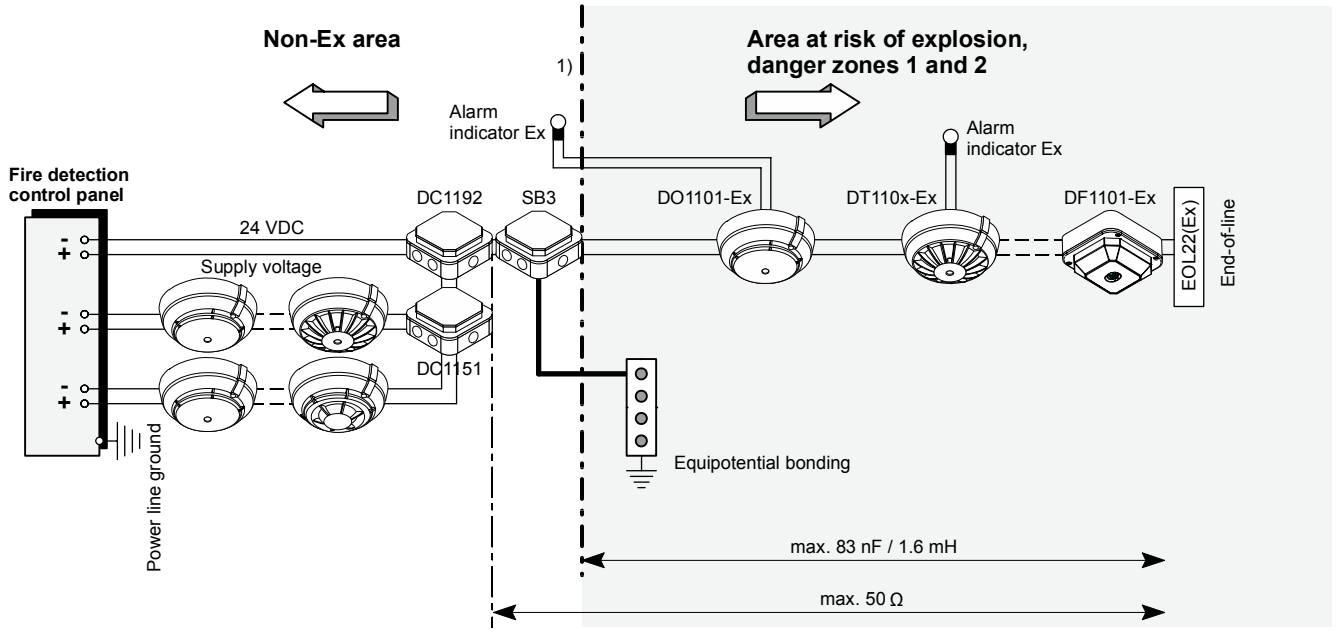


Fig. 17 CS1140 interactive (in front of EP5)

[1] depending on specification, a return barrier may be needed, see chapter 9.3.2

9.4.6 CS1140 interactive or AnalogPLUS (as of EP5) (in Ex area collective detector)

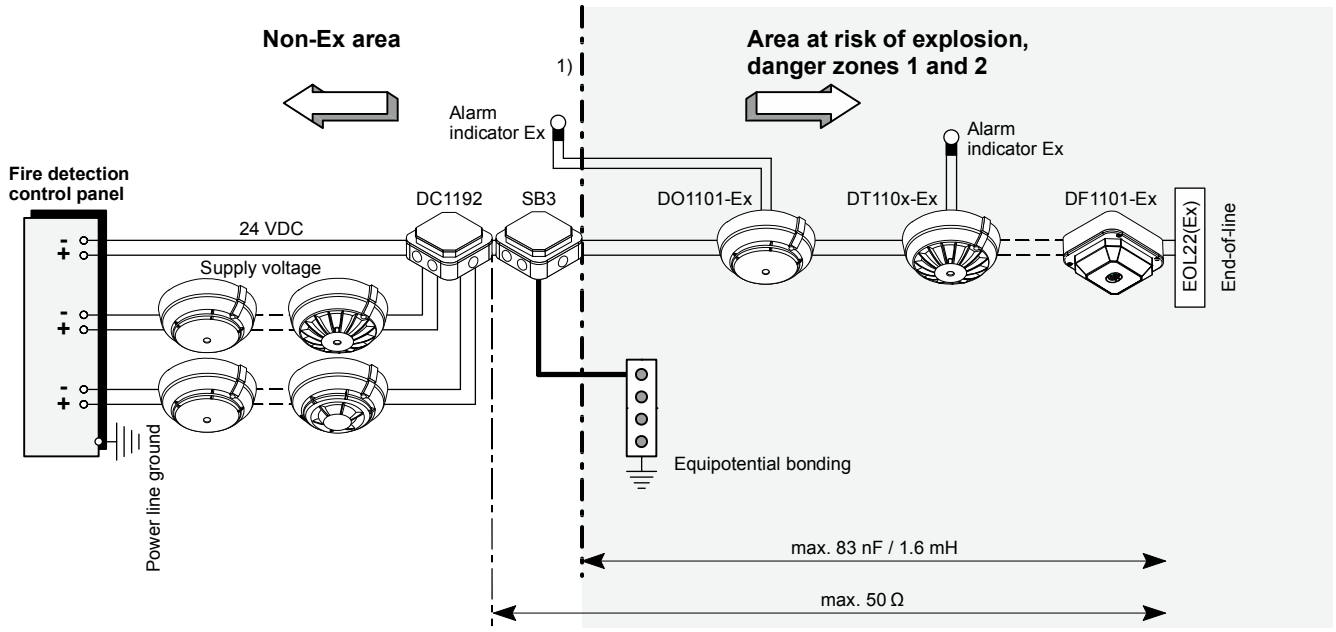


Fig. 18 CS1140 interactive or AnalogPLUS (as of EP5)

[1] depending on specification, a return barrier may be needed, see chapter 9.3.2

9.4.7 CS1140 collective, with one SB2 per system

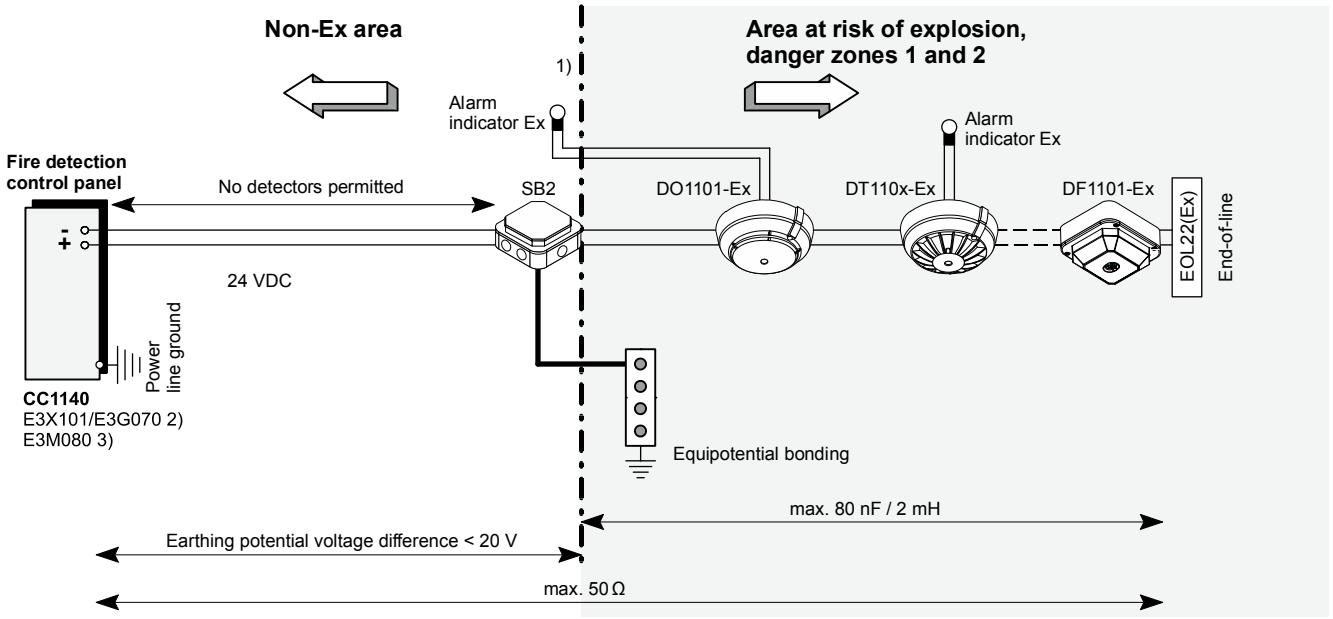


Fig. 19 CS1140 collective, with one SB2 per system

1) depending on specification, a return barrier may be needed, see chapter 9.3.2
2) only with isolated ground fault monitoring
3) only line type 3 permitted

9.4.8 CS1140 collective, with several SB2 per system

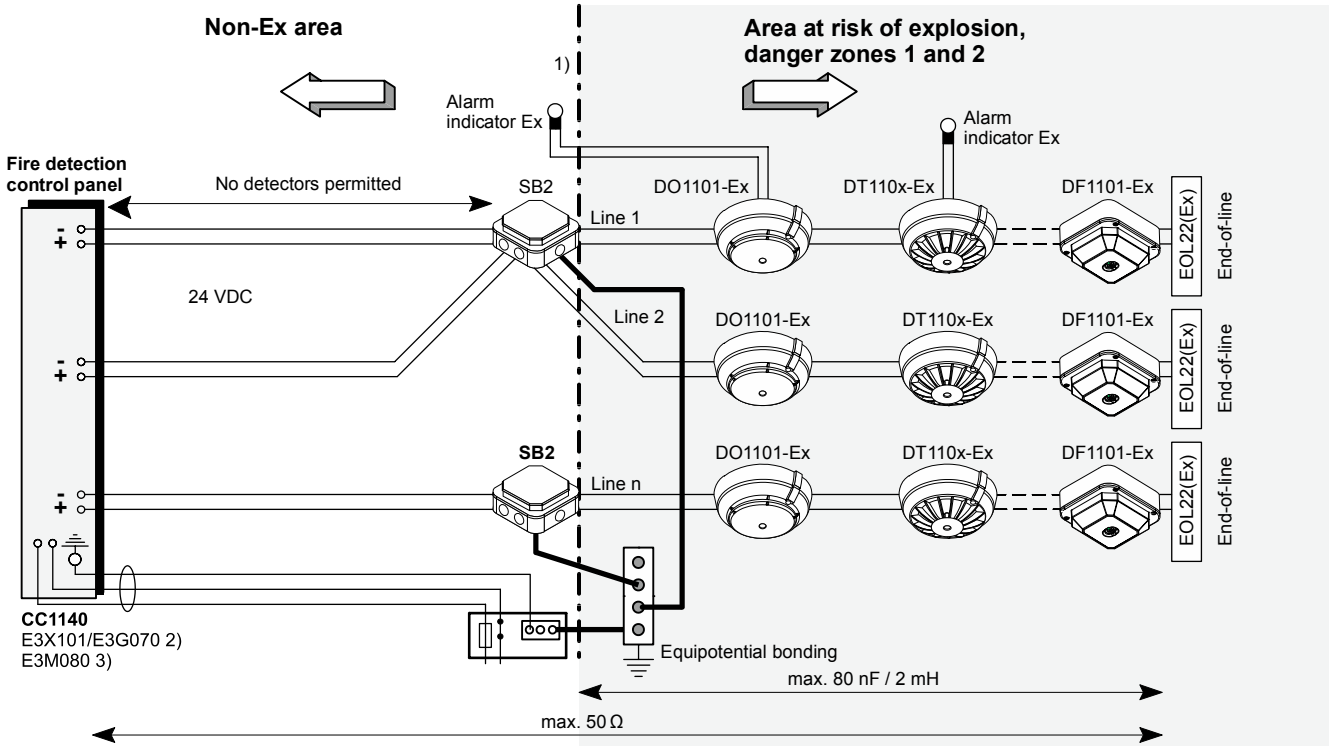


Fig. 20 CS1140 collective, with several SB2 per system

1) depending on specification, a return barrier may be needed, see chapter 9.3.2
2) only with isolated ground fault monitoring

[3] only line type 3 permitted

9.4.9 CS1140 interactive (in Ex area interactive detector)

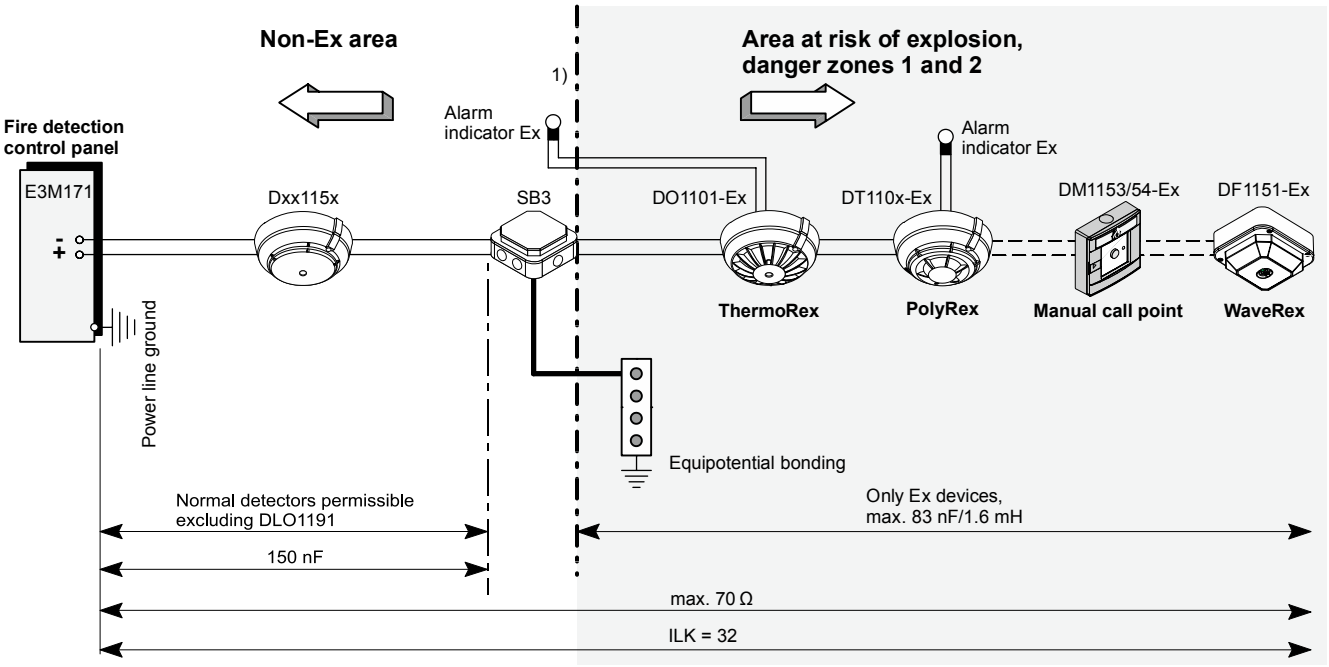


Fig. 21 CS1140 interactive

[1] depending on specification, a return barrier may be needed, see chapter 9.3.2

9.4.10 CZ10, CS1140, CS1110/15, flame detector (UL/ULC)

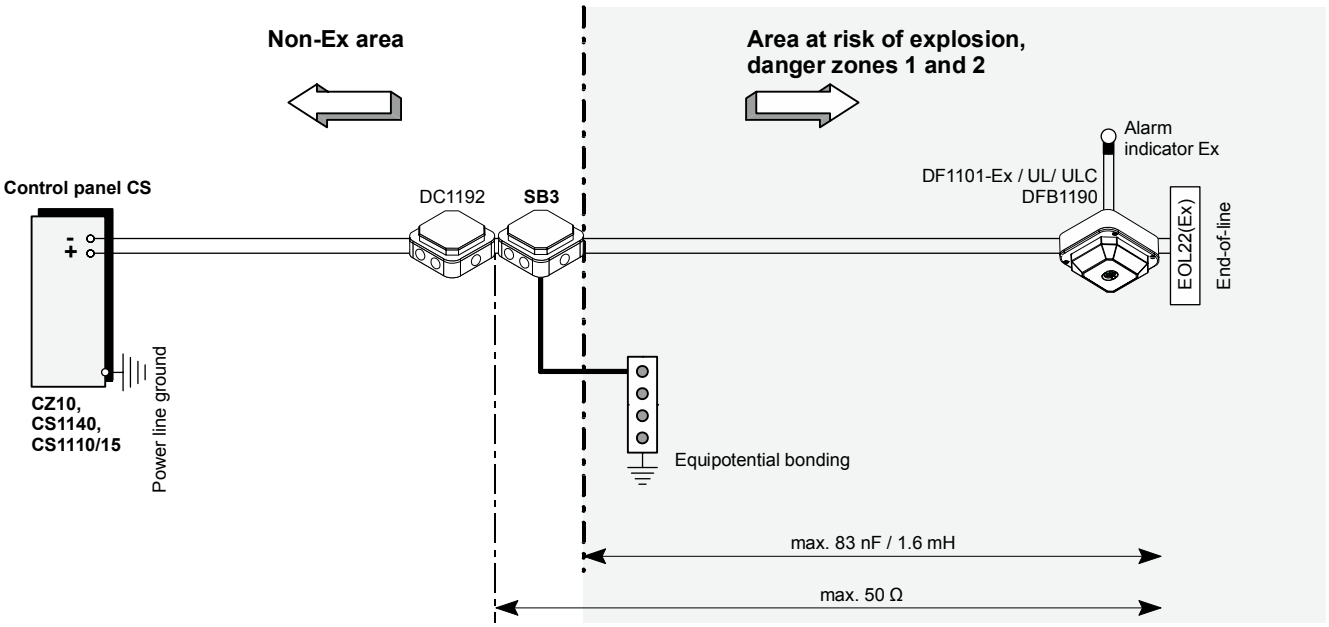


Fig. 22 CZ10, CS1140, CS1110/15, flame detector

9.4.11 SIGMASYS C, M, L, D100 control panels with transponders SPF 3500, SB3 and DC1192

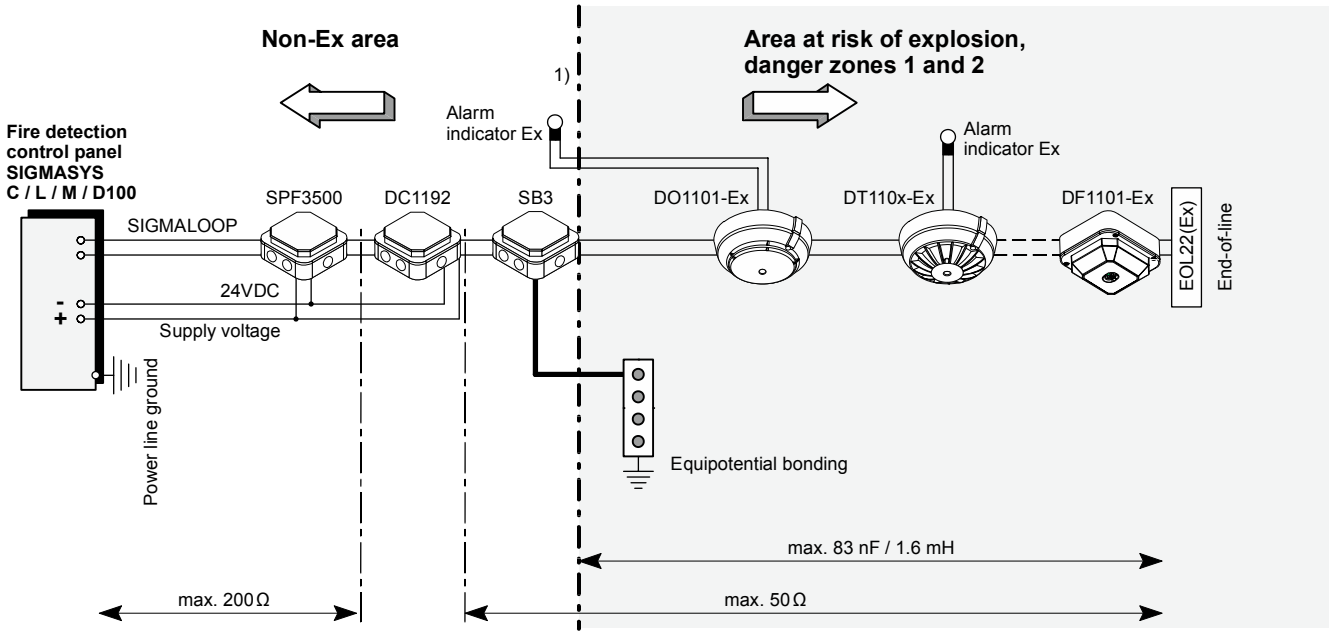


Fig. 23 SIGMASYS C, M, L, D100 control panels with transponders SPF 3500, SB3 and DC1192

[1] depending on specification, a return barrier may be needed, see chapter 9.3.2

9.4.12 SIGMASYS M, L, D100 control panels with GMG-S, SB3 and DC1192

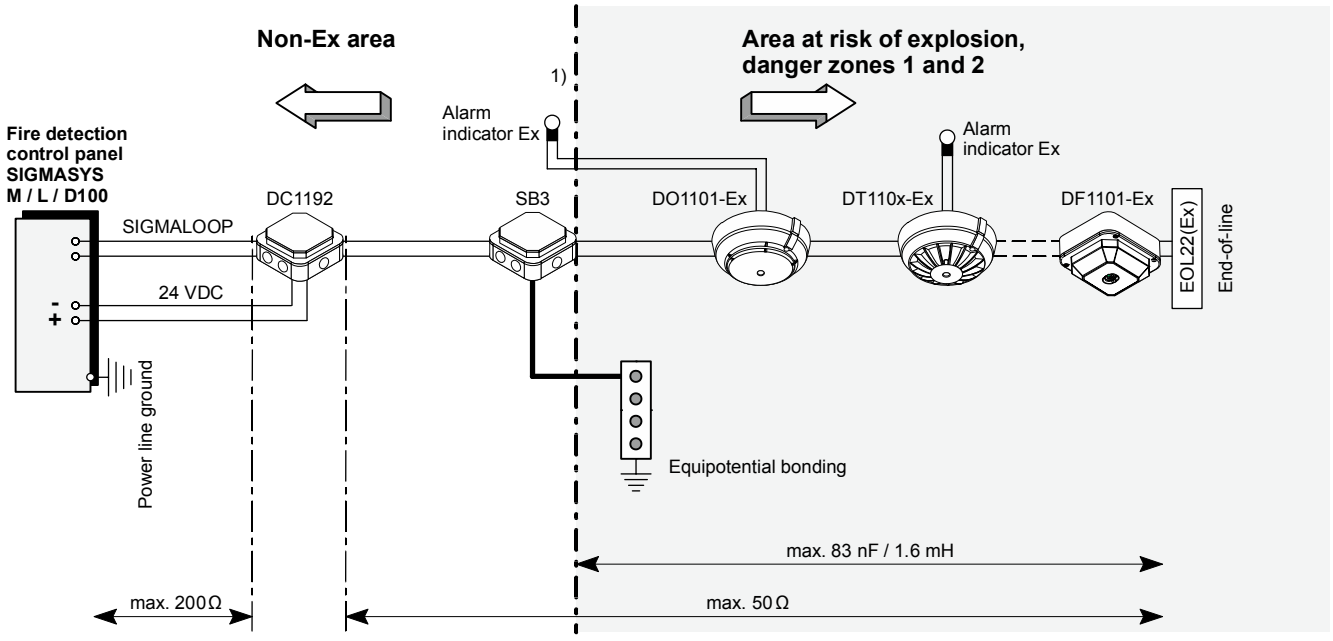


Fig. 24 SIGMASYS M, L, D100 control panels with GMG-S, SB3 and DC1192

[1] depending on specification, a return barrier may be needed, see chapter 9.3.2

9.4.13 BMS 16-240 control panels, GMG with SB3 and DC1192

When the detector zone and alarm activation are isolated, DC1192 and detector flash until the detector zone is switched back on again. No alarms are activated on the control panel!

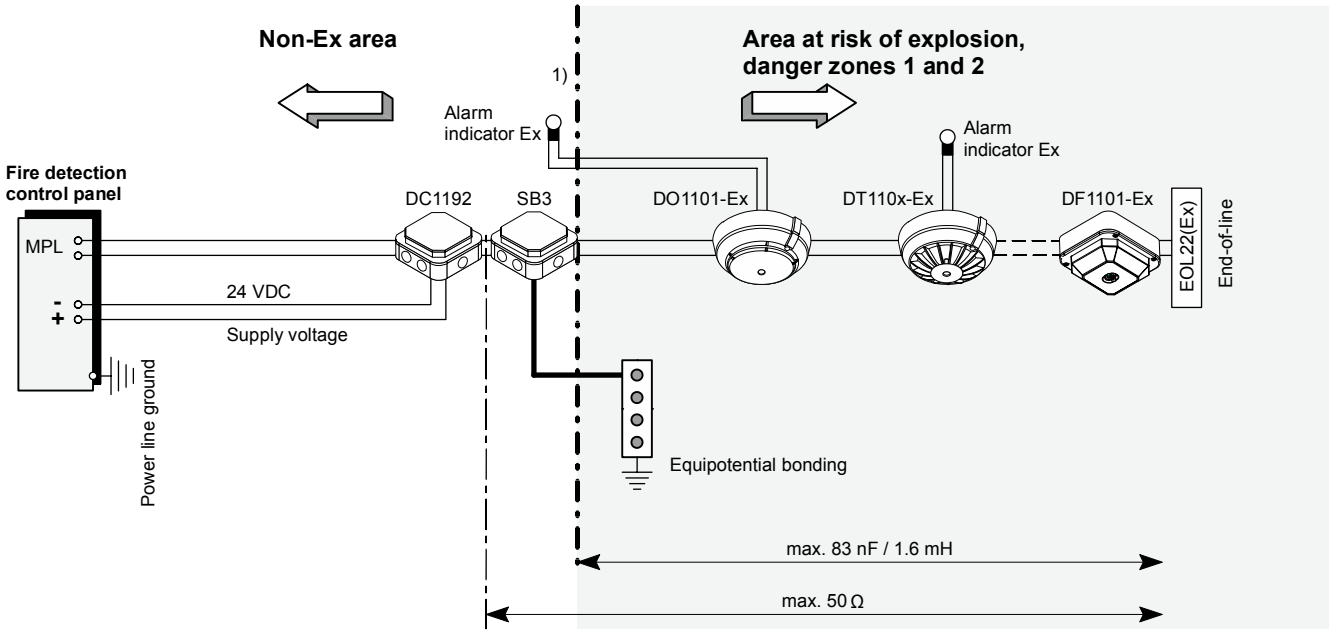


Fig. 25 BMS 16-240 control panels, GMG with SB3 and DC1192

[1] depending on specification, a return barrier may be needed, see chapter 9.3.2

9.4.14 SIGMASYS B control panels with SPF3500, SB3 and DC1192

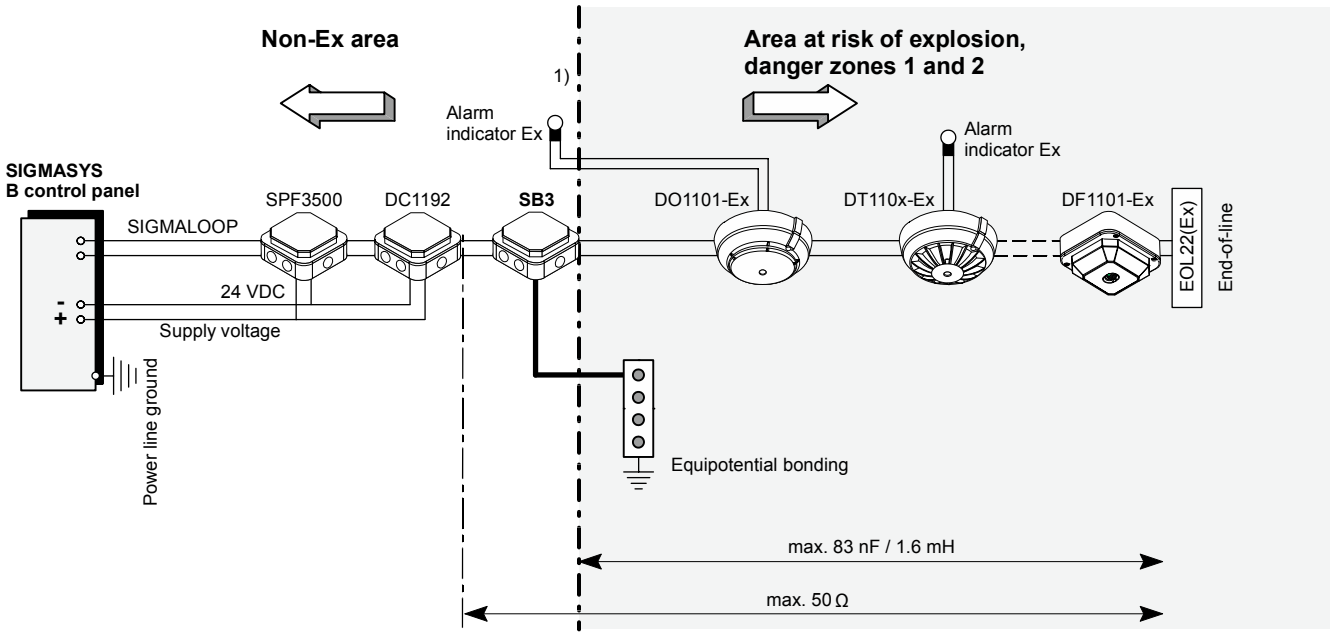


Fig. 26 SIGMASYS B control panels with SPF3500, SB3 and DC1192

[1] depending on specification, a return barrier may be needed, see chapter 9.3.2

9.4.15 SM88 / D100 control panel with SB3 and DC1192

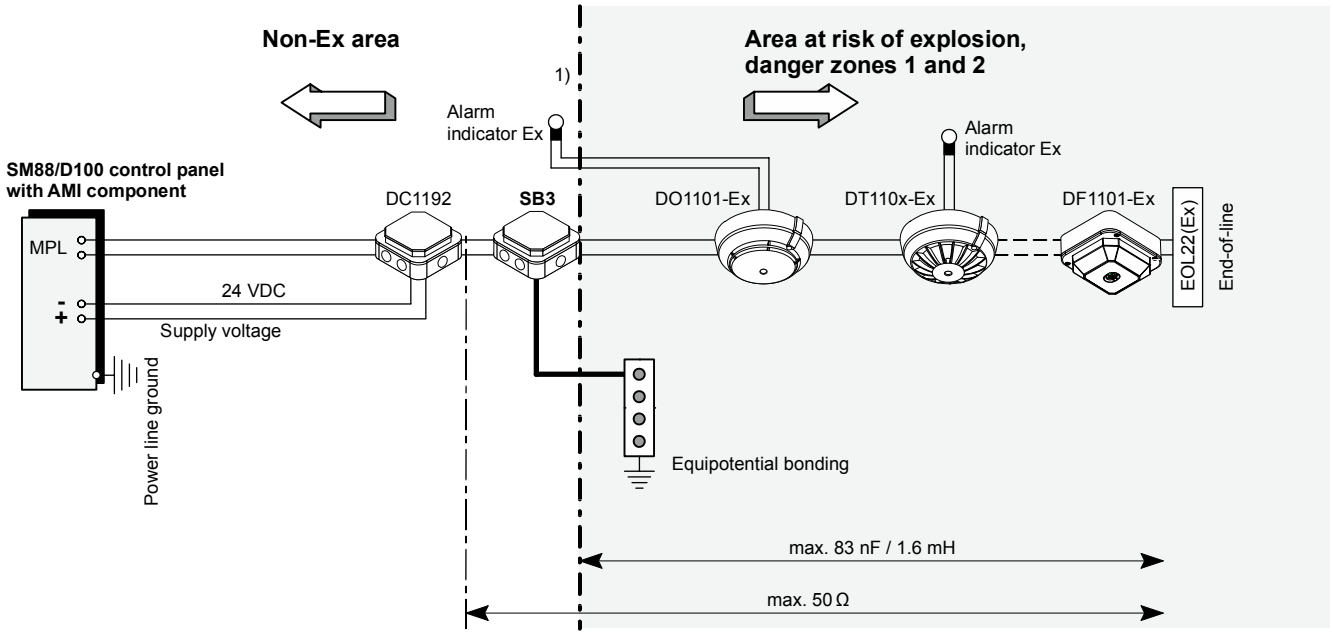


Fig. 27 SM88 / D100 control panel with SB3 and DC1192

[1] depending on specification, a return barrier may be needed, see chapter 9.3.2

9.4.16 Activation on control panels with FDnet/C-NET via transponder FDCIO223 and SB3

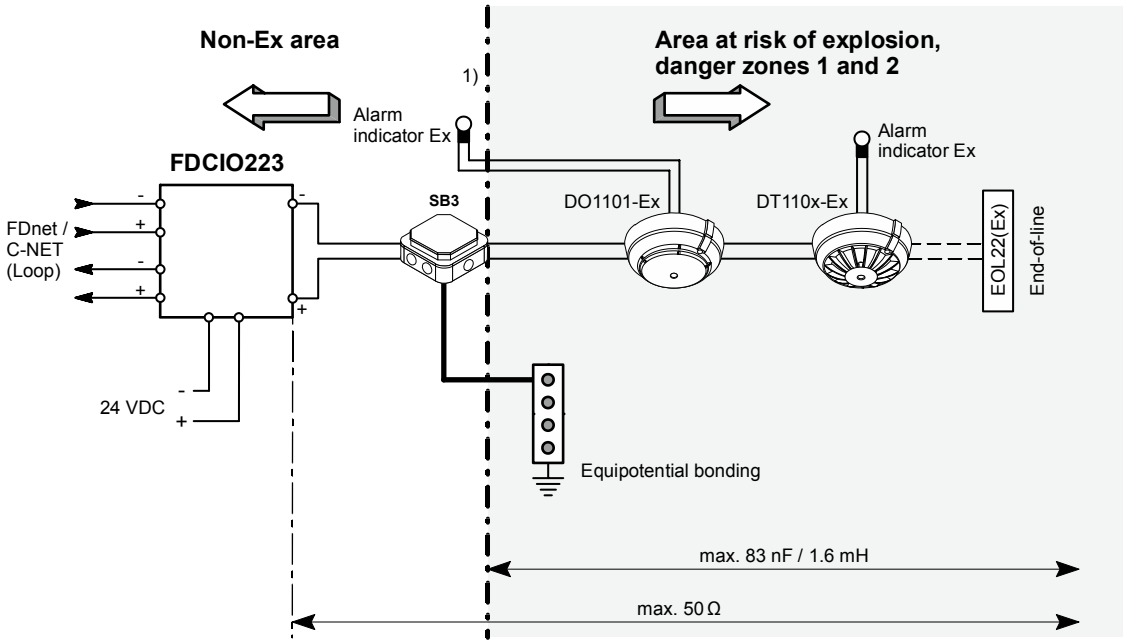


Fig. 28 Activation on control panels with FDnet/C-NET via transponder FDCIO223 and SB3

9.4.17 Activation on control panels with FDnet/C-NET via zone module FDCI223/FDCI723 and SB3

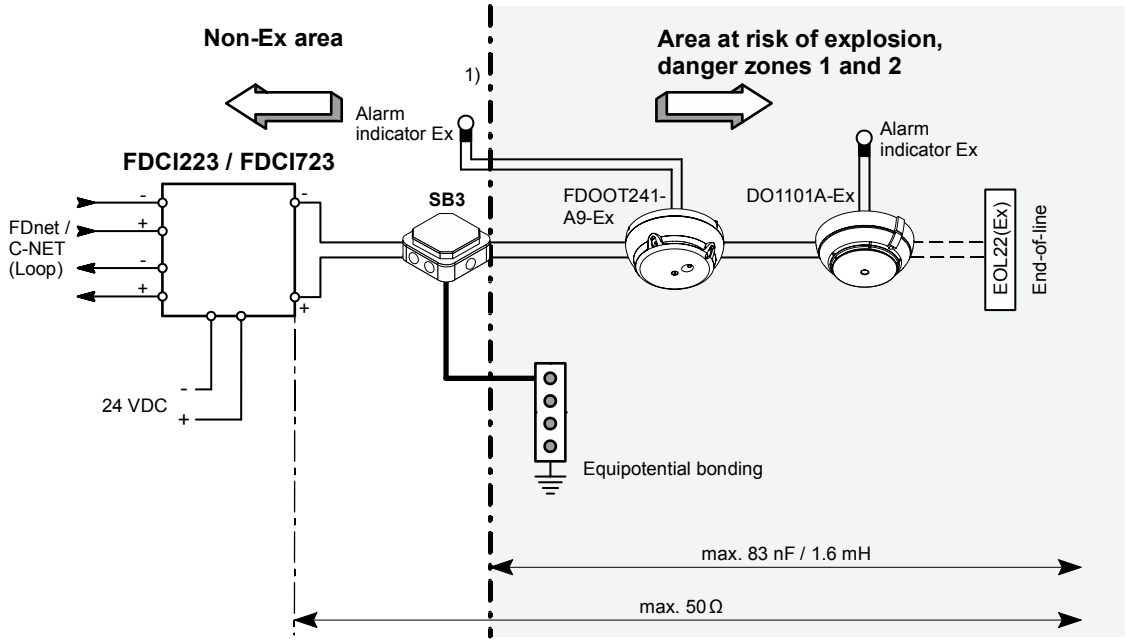


Fig. 29 Activation on control panels with FDnet/C-NET via zone module FDCI223/FDCI723 and SB3

Note: The FDOOT241-A9-Ex or OOH740-A9-Ex can be used in collective mode instead of the smoke and heat detectors DO1101-Ex and DT110x-Ex. Observe the technical manuals A6V10346580 and A6V10367521 for setting the parameters of the detectors and for operation in collective mode.

10 Connection diagram

10.1 With safety barrier SB3

10.1.1 Connection diagram with base type Z94C, DB1101A, DB1151A, manual call point DM1101, DM1103, DM1104, DM1153-Ex, DM1154-Ex

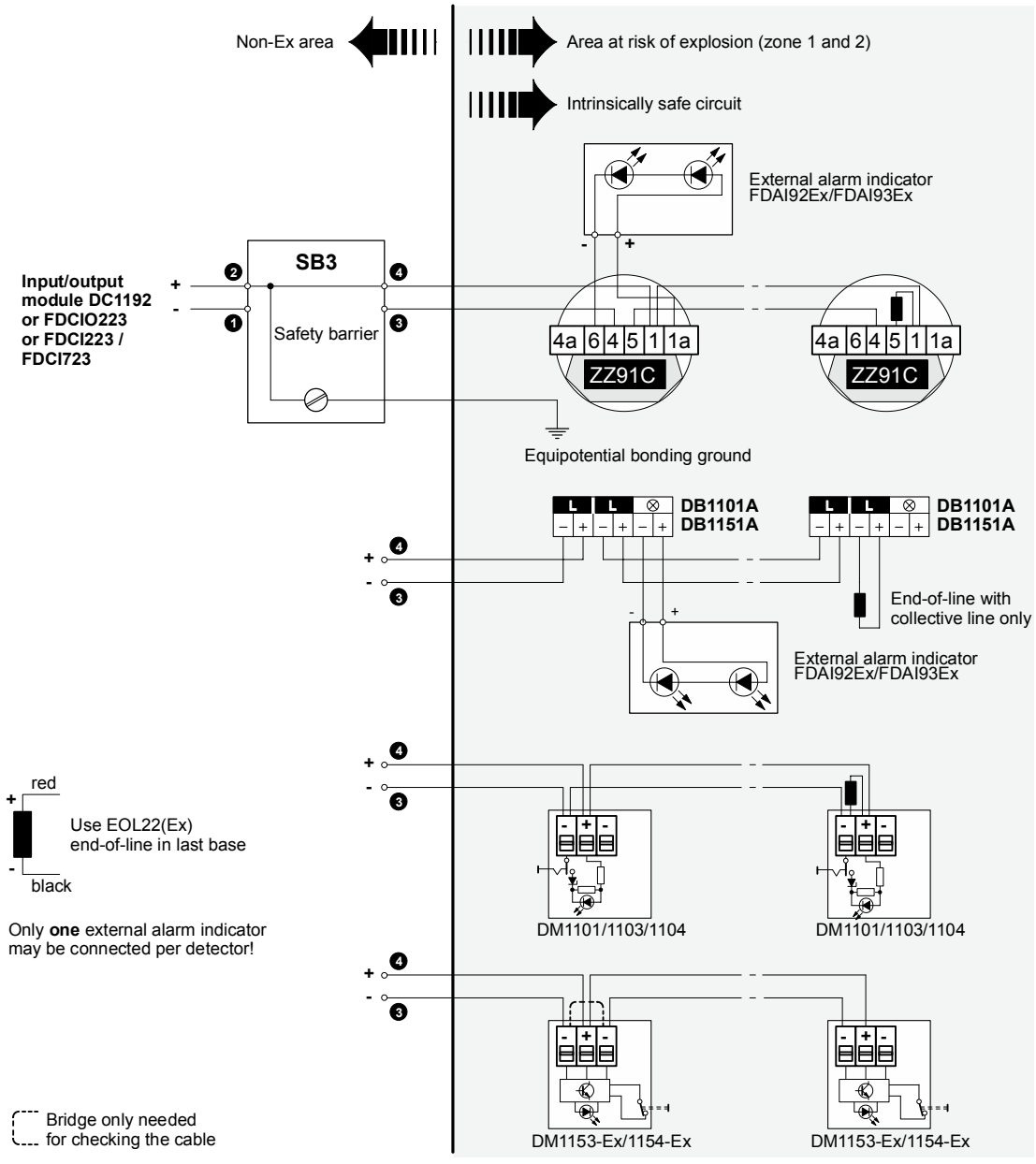


Fig. 30 Connection diagram with base type Z94C, DB1101A, DB1151A, manual call point DM1101, DM1103, DM1104, DM1153-Ex, DM1154-Ex

1) For line resistance, see chapters 8.3.1 to 8.3.6 and chapter 8.3.9. Capacity/inductivity as of SB3 max.83 nF/1.6 mH

10.1.2 Connection diagram FDOOT241-A9-Ex/OOH740-A9-Ex

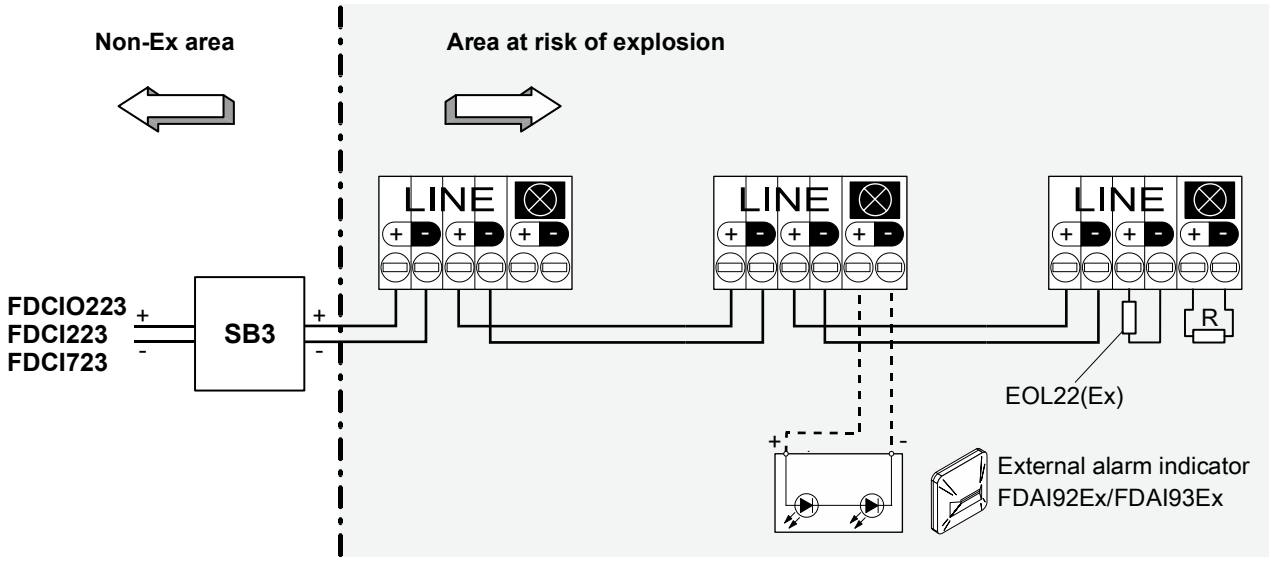


Fig. 31 Connection diagram with FDOOT241-A9-Ex/OOH740-A9-Ex

Values for the parameter set resistance R

R	Parameter set
∞	Sensitive (when replacing a point detector DO1101-Ex)
18 kΩ	A1R (when replacing a point detector DT1101A-Ex)
10 kΩ	BR (when replacing a point detector DT1102A-Ex)

10.2 With SB2 safety barrier

10.2.1 Connection with base type Z94C, DB1101, manual call point DM1101, DM1103, DM1104

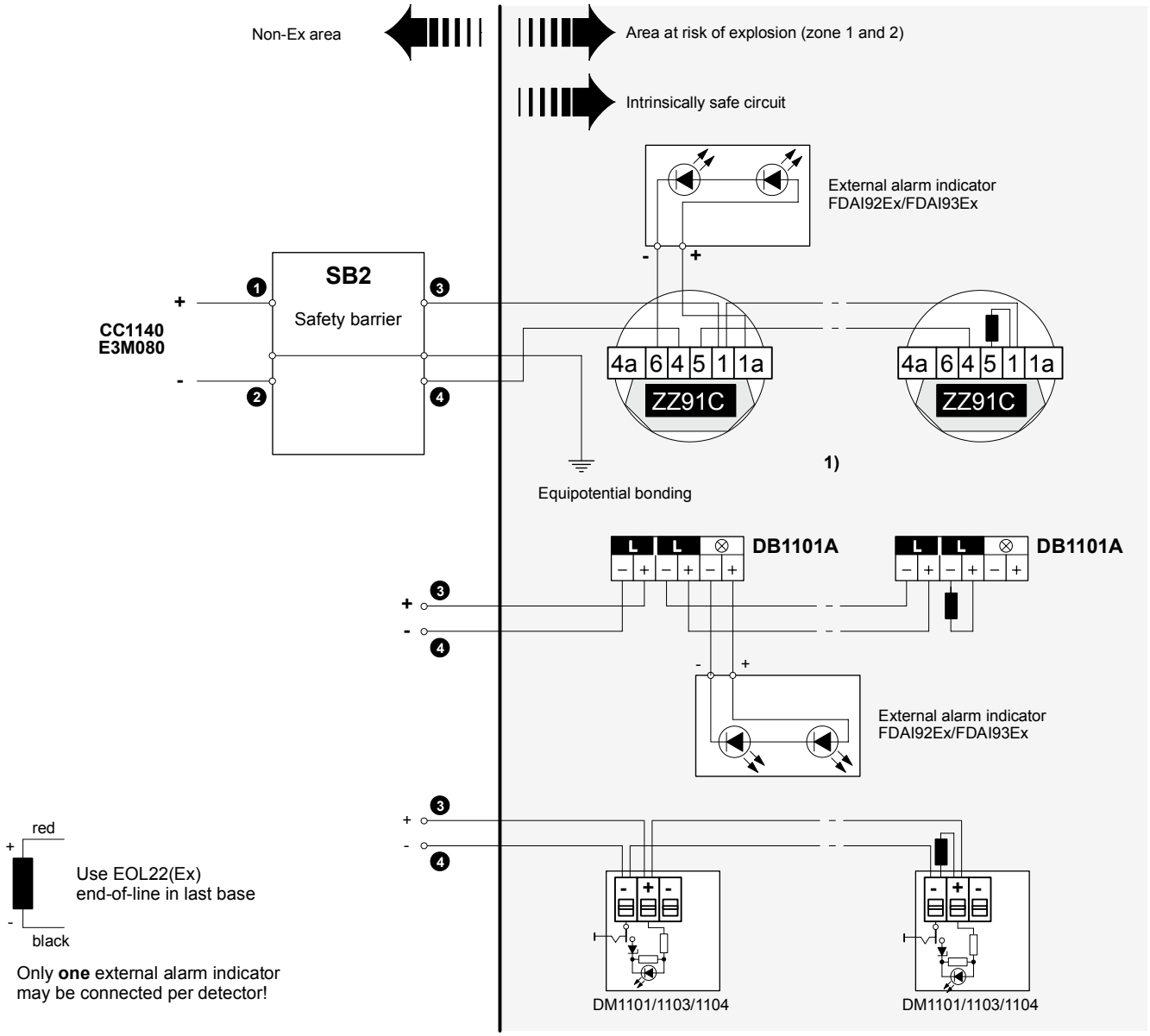


Fig. 32 Connection with base type Z94C, DB1101, manual call point DM1101, DM1103, DM1104

[1] For line resistance, see chapters 8.3.7 and 8.3.8.
Capacity/inductivity as of SB3 max. 80 nF/2 mH

11 Activation of alarm devices in areas at risk of explosion

11.1 Control line DB3 monitored

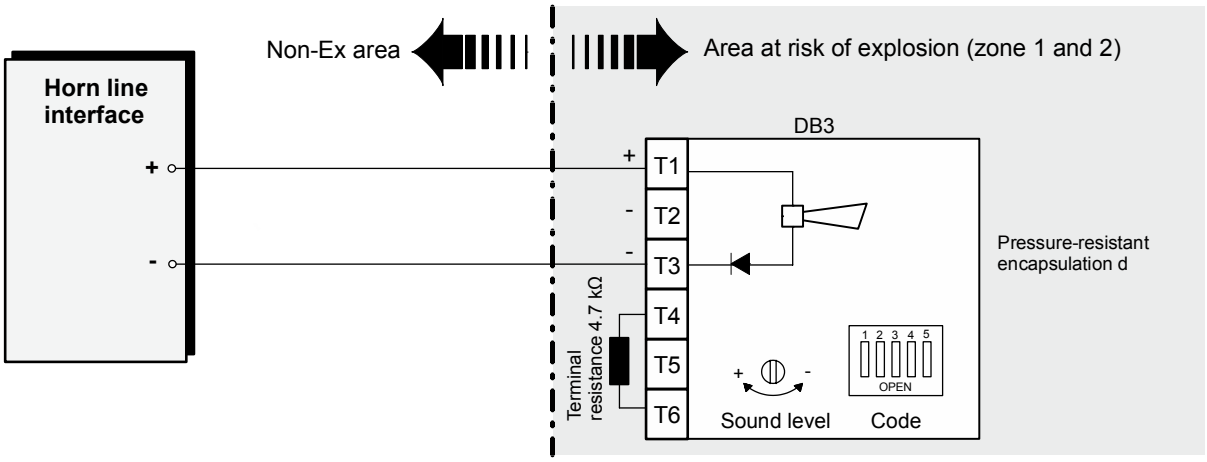


Fig. 33 Control line DB3 monitored; "pressure-resistant encapsulation d" ignition protection category

11.1.1 Option: Connection to DC1192 in AnalogPLUS and/or interactive fire detection system

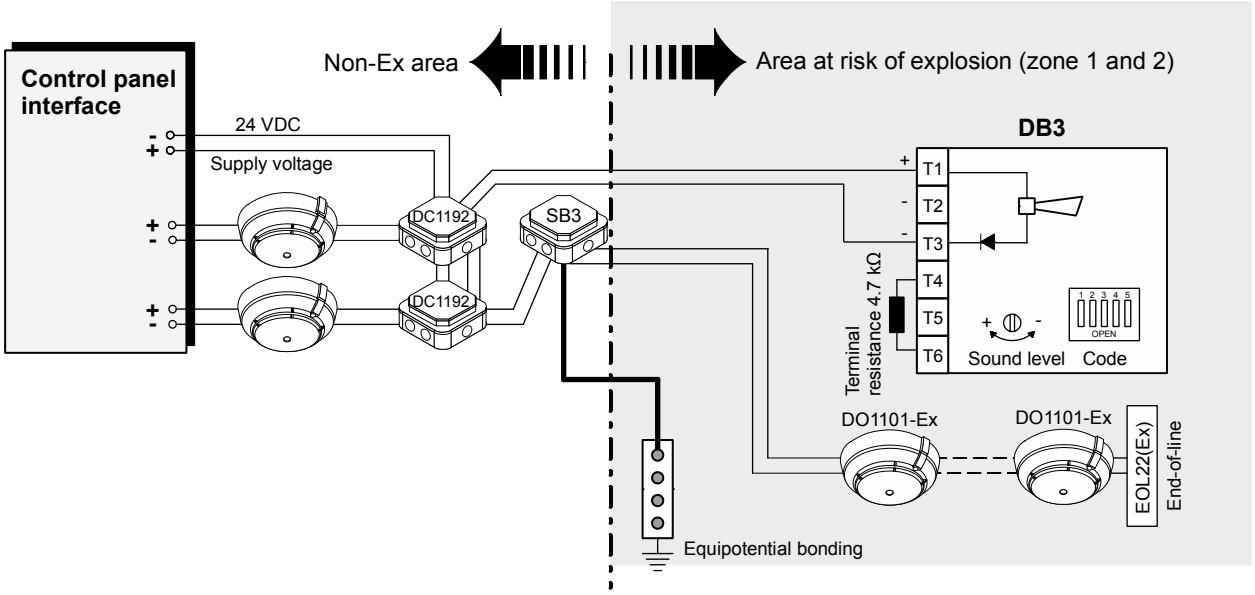


Fig. 34 Option: Connection to DC1192 in AnalogPLUS and/or interactive fire detection system

11.2 Connection of illuminated warning panel LTEX24.1

11.2.1 "Increased safety e" ignition protection category

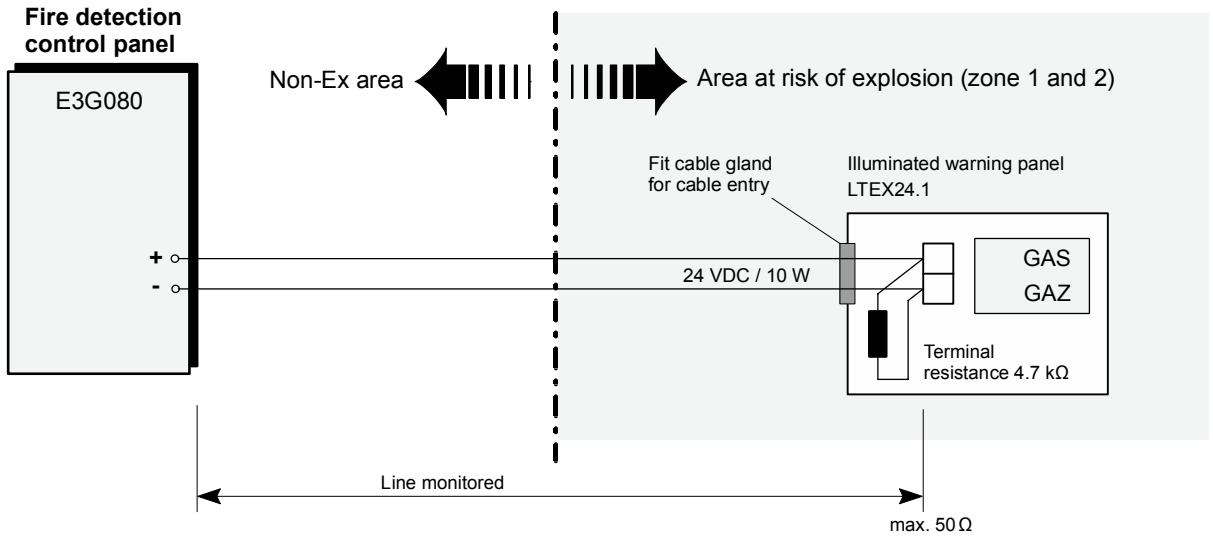


Fig. 35 "Increased safety e" ignition protection category

12 Checking the detector lines

Warning!	There must not be any explosive atmospheres present in the Ex area during the detector line check.

12.1 Using base tester to test detector line

The DZB1191 base tester can be used to test all DB11xx bases for correct polarity, short-circuit, open line, ground fault etc. Handling is described in the operating instructions for DBZ1191, document no. 1088.
If DBZ1191 is not available, the cable measurement can also be undertaken following chapter 12.2 .

12.2 Measuring the line insulation

Insulation of the detector lines may only be checked using an ohmmeter (measured voltage <10 V).
During the insulation check, ensure that all apparatus are connected and that the entire line length is covered from the safety barrier to the final apparatus.
Neither the control panel nor the end-of-line may be connected to the detector line being tested during the check.
Permissible insulation values:

– Conductor to conductor	> 1 MΩ
– Conductor to earth	> 1 MΩ
– Conductor to shielding (if present)	> 1 MΩ

Tab. 14 Permissible insulation values

Warning!	The detector lines must be tested without safety barriers.

13 Commissioning

13.1 Smoke detectors F911, DO1101A-Ex, DO1151A-Ex

DANGER!	The control panel software cannot test whether Ex detectors are really installed in the Ex area. It is the responsibility of the commissioning engineer and system operator to use the right detectors in the Ex area.

13.1.1 Performance check

- Switch control panel to "DETECTOR TEST".
- Use detector tester RE6 to active all detectors used following instructions on test unit.

DANGER!	The detector exchanger and tester DZ1193 may only be used as long as the room is still not at risk of explosion.

- Check internal alarm indicator (AI) (AI flashes).
- Check any external alarm indicators connected (AI flashes).

13.2 Heat detectors D911, D921, DT1101A-Ex, DT1102A-Ex, DT1151A-Ex

Performance check

- Use detector tester RE6T to activate all thermal detectors used.

Warning!	The detector tester RE6T may only be used as long as the room is still not at risk of explosion.

- If the above requirement cannot be met, test thermal detectors outside the Ex zone.
- To check the detector line in the Ex zone tentatively use the Ex smoke detector and alarm using test device RE6 (with test gas).
- Check internal alarm indicator (AI) (AI flashes).
- Check any external alarm indicators connected (AI flashes).

13.3 Smoke detector DO1101A-Ex

- Switch control panel to "Inspection".
- Use detector tester RE6 to active all detectors used following instructions on test unit.

13.4 Multi-sensor fire detector FDOOT241-A9-Ex, OOH740-A9-Ex

- Before commissioning the detector line, the parameter sets can be selected by installing or leaving out resistors in the detector base. For details, see chapter 10.1.2.
- You will find information about performing a function check on the fire detectors in document A6V10346580 for the FDOOT241-A9-Ex and A6V10367521 for the OOH740-A9-Ex.

13.5 Infrared flame detectors S2406Ex and DF1101-Ex/DF1101-Ex (UL/ULC)

Performance check

Warning!	Neither the LE3 test lamp nor a candle nor lighter may be used in the Ex area.

- Hold S2406Ex STABEX lamp vertically in front of detector sensor A at approx. 10-20 cm.
- Hold DF1101/51-Ex STABEX lamp vertically in front of detector sensor A at approx. 5 cm and cover sensor B.
- Use sliding switch to pulse in cycle of around 2-Hz.

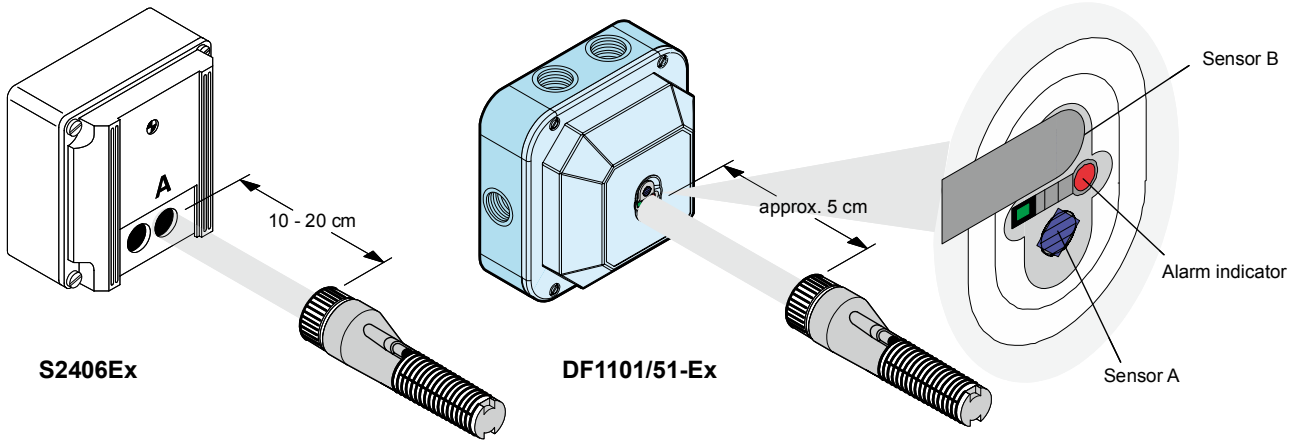


Fig. 36 Performance check with STABEX lamp

- Check internal alarm indicator (AI) (AI flashes).
- Check any external alarm indicators connected (AI flashes).

13.6 Manual call point

Performance check

- Depending on type, use special tool to activate or open cover (press button if necessary).
- Alarm indicator flashes.

14 Index

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