Instructions for use

Flame detector

UniVario® FMX5000 IR Ex

IMPORTANT! Read this document before starting any work!

This document is a mandatory part of the product and should therefore always be stored freely accessible and for further usage.

Original document

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1 General

1.1 About this document

This document enables the intended use of the product described. Observing all specified instructions and safety instructions is the prerequisite for safe work. Furthermore, the local accident prevention regulations and general safety conditions for the use of the product are also applicable.

If this document refers directly or indirectly to laws, regulations, or directives or quotes from them, the manufacturer cannot be held responsible for the correctness, completeness or up-to-date nature of the reference.

Observe the applicable guidelines, standards, and statutory legislation of the respective country of deployment.

INFORMATION

The manufacturer reserves the right to make modifications resulting from further developments while retaining the key features of the product described without making corrections to this document.

Illustrations in this document are intended to facilitate basic understanding, and may differ from the actual design of the product.

1.2 Validity

This operating manual is valid for flame detectors of Type UniVario® FMX5000 IR Ex (hereinafter referred to as FMX5000 IR Ex) from software version V02E39 with all the variants listed in the Annex
↳ *Appendix C "Detector types with part numbers" on page 86*.

1.3 Copyright

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1.4 Intended use

FMX5000 IR Ex flame detectors are designed to detect open flames that can occur during the combustion of materials containing carbon, such as methane, oil products, plastics, and wood.

2 Safety

2.1 Safety and warning notices

Safety and warning notices are marked with symbols in this document. The introductory signal words express the respective extent of the danger.

DANGER

The signal word describes a danger with a high risk level. If the danger is not avoided, it will result in death or serious injury.

WARNING

The signal word describes a danger with a medium risk level. If the danger is not avoided, it may result in death or serious injury.

CAUTION

The signal word describes a danger with a low risk level. If the danger is not avoided, it may result in minor or moderate injury.

NOTICE

The signal word describes a danger with a low risk level. If the danger is not avoided, it may result in property and environmental damage.

Further markings

INFORMATION

This marking emphasizes useful tips and recommendations as well as information for efficient and trouble-free operation.

In instructions, this marking starts with the symbol .

2.2 Intended use

These products are designed for use in industrial production plants only.

These products must only be used in accordance with the operating conditions detailed in the contract documentation and the operating manual. Use for any other or additional purpose does not constitute an intended use. The manufacturer is not liable for any damage resulting from such use; this is entirely at the risk of the user.

Intended use includes:

- Observing all notices contained in the operating manual
- Complying with the operating, servicing, maintenance, and ambient conditions.

2.3 Safe operation

The products described here exhibit a high degree of operational safety.

However, the products can pose hazards or impair the system or other property if used improperly or for other than their intended purpose. The products must only be used in an undamaged and fully functional condition. Physical modifications to the product are not permitted.

The following details must be observed for proper and safe operation:

- Explosion hazard regulations
- National safety regulations
- National accident prevention regulations
- National assembly and installation regulations
- Generally accepted technical principles
- Operating manual including its safety and warning notices
- Characteristics and technical data

If safe operation can no longer be ensured (e.g. in the case of damage), the product must be put out of operation without delay and secured against accidental start-up.

NOTICE

Explosion protection is no longer guaranteed if the product is damaged!
Improper handling of the product may result in damage, impair seal tightness of the product and invalidate explosion protection. Seal tightness of the product is relevant for correct functioning.
Ensure proper handling of the product.

2.4 Qualification of personnel

WARNING

Inadequately qualified persons pose a hazard!
Inadequately qualified persons cannot assess the risks involved in handling the product. They expose themselves and others to the risk of severe or fatal injuries.
- All work should be carried out only by persons qualified to do so.

Before starting any work, the following persons must be designated who have the knowledge required to operate the product:

- A person to be responsible for the system
- An operator/person authorized by the operator

For all tasks, only persons from whom it can be expected that they will carry out their tasks reliably are authorized to perform such tasks. Persons whose reaction time is affected, for instance by drugs, alcohol or medication, are not authorized.

Furthermore, all work must only be carried out by persons who meet the following prerequisites:

- They have read and understood this document including the safety instructions and warning notices.
- They are familiar with basic regulations on occupational safety and accident prevention.
- They have been given instruction on handling the product and the entire system.

The various tasks described in this document require that the persons responsible for them have different qualifications. These qualifications are specified in the following section:

Operator/person authorized by the operator
The operator/person authorized by the operator has verifiably been given instructions by the company that installed the system as to the specifics of the tasks entrusted to him/her and all possible dangers that may arise from improper conduct.

The operator/person authorized by the operator is the person who is responsible for the correct and proper completion of the work and inspections performed on the system.

Qualified specialist personnel
Qualified specialist personnel are persons with the following qualifications and authorizations:

- Such persons are qualified for the respective activities as a result of their education, experience and participation in a training course conducted by the manufacturer.
- These persons have the appropriate knowledge of standards, directives, accident prevention regulations and operating conditions.
- These persons have been authorized by the person responsible for the safety of the installation to carry out the necessary activities and are capable of recognizing and avoiding possible risks.

Unauthorized persons

⚠ WARNING

Risk of injury for unauthorized persons!
Unauthorized persons who do not meet the requirements described are not familiar with the risks connected with the function (e.g. triggering and/or isolating) of the system.
This poses risk of injury.
- Keep unauthorized persons away from control equipment.
- In the case of doubt, speak to persons and instruct them to move away from control equipment.

2.5 Responsibility of the operator

Personnel: ■ Operator/person authorized by the operator

Areas of responsibility, competence, and monitoring of personnel must be specified by the operator.

The operator commits to allow only specialist personnel to work at or with the detector. Such personnel shall

- be familiar with basic regulations on occupational safety and accident prevention,
- have been given instruction on handling the detector and the entire system
- and have read and understood the operating manual, including the safety and warning notices.

2.6 Fields of use

FMX5000 IR Ex flame detectors are used in areas where an open flame can be immediately anticipated at the beginning of a fire, e.g. in storage locations for flammable liquids or gases. Only flames from fuels containing carbon can be detected.

These detectors are especially well suited for use where fire risks arise from gaseous or liquid materials in areas with aggressive media, e.g. tank storage locations and to protect objects located indoors and outdoors.

Because of their relatively large possible monitoring range, their application is recommended especially in particularly large, high rooms while taking account of the fire development to be anticipated and disturbance variables which may exist.

NOTICE

Smoldering fires are not detected
FMX5000 IR Ex flame detectors must not be used at locations where fires can occur without a clearly detectable flame formation (e.g. smoldering fire).

Field of application - FMX5000 IR Ex

These detectors with ignition protection category "intrinsic safety" are suitable for use in the following explosion hazard areas: Zone 1, 2, 20, 21 and 22.

The detectors must only be operated in intrinsically safe circuits using certified safety barriers with U_{max} ≤ 28 V, I_{max} ≤ 100 mA, P_{max} ≤ 1.2 W. The detectors have a corresponding marking on the nameplate and an additional nameplate on the outside of the detector ↬ *Chapter 3.11.2 “Nameplate on FMX5000 IR Ex” on page 21*.

Field of application - FMX5000 IR Ex ST

These detectors with ignition protection category "intrinsic safety" are suitable for use in the following explosion hazard areas: Zone 0, 1, 2, 20, 21 and 22. They have a stainless steel housing instead of an aluminum die-cast housing. The detectors must only be operated in intrinsically safe circuits using certified safety barriers with U_{max} ≤ 28 V, I_{max} ≤ 100 mA, P_{max} ≤ 1.2 W. The detectors have a corresponding marking on the nameplate and an additional nameplate on the outside of the detector ↬ *Chapter 3.11.3 “Nameplate on FMX5000 IR Ex ST” on page 21*.

Field of application - FMX5000 IR SF

All detectors are available in silicone-free versions and thus free of substances which inhibit paint adhesion. For example, these detectors can be used in paint finishing plants.

INFORMATION

Ensure that the assembly and installation accessories as well as the detector base are also silicone-free during assembly and installation.

3 Design and function

3.1 General description of the function

FMX5000 IR Ex flame detectors have three optical input channels and react to flames from fuels containing carbon.

Depending on the respective version, the detectors are suitable for indoor and outdoor use and approved for use in the following explosion hazard areas: Zone 0, 1, 2, 20, 21 and 22.

Extensive analyses of the flame characteristics and their comparison with the characteristics of typical disturbance variables have allowed a high degree of security against false alarms to be achieved by suppressing disturbance variables, so that on the one hand large flames are quickly detected, and on the other hand even weak signals from small flames are reliably detected.

The fire sensitivity of the detector can be set either to correspond to EN 54 Part 10, Classes 1, 2 or 3 or set to correspond to maximum fire sensitivity X (50 m (55 yd)). The setting can be carried out at the installed DIP switch ↬ *Chapter 5 “Configuration” on page 31*.

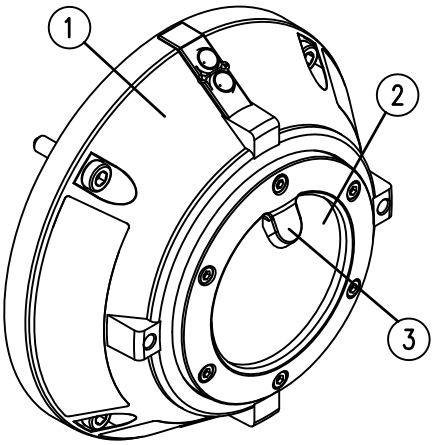
The electronic equipment is designed for low energy consumption, allowing use in battery-powered systems. The extremely rugged industrial aluminum die-cast or stainless steel housing complies with protection type IP66 and IP67.

The detectors use constant current to indicate a fire has been detected. This current additionally flows from the supply voltage through an internal alarm circuit. This alarm circuit is latching and, after the fire event is over, can only be reset by briefly switching off the supply voltage – the so-called “line cycle time”.

Test triggering is possible via a reed switch using a magnet.

A communication module which can be retrofitted enables operation as individually addressable detectors on fire alarm control panels with Apollo protocol technology.

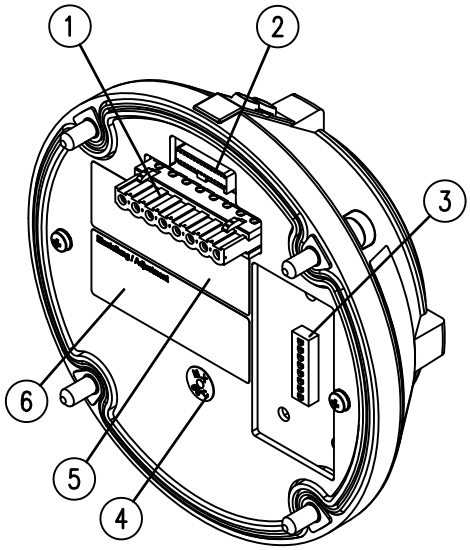
Basic detector design



1 Detector
2 Optical system
3 Reflector

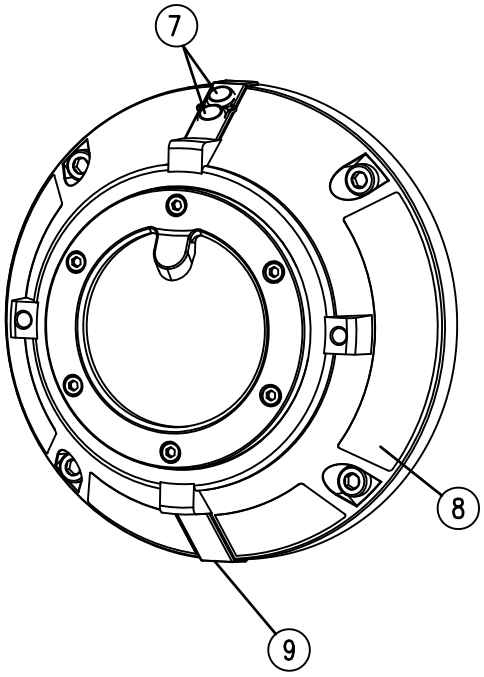
Fig. 1: FMX5000 IR Ex front view

Front and rear view



1 Terminal strip
2 Socket strip
3 DIP switch ↳ *Chapter 5 “Configuration” on page 31*
4 Temperature measuring pad ↳ *Chapter 3.10 “Temperature measuring pad” on page 20*
5 Nameplate ↳ *Chapter 3.11 “Device markings” on page 20*
6 Fire sensitivity label

Fig. 2: FMX5000 IR Ex rear view



7 Status indicators
8 Additional nameplate with explosion protection marking ↳ *Chapter 3.11 “Device markings” on page 20*
9 Reed switch (inside)

Fig. 3: FMX5000 IR Ex front view

3.2 Detector types

The designs and characteristics of the different detector variants are described below.

3.2.1 Detector type FMX5000 IR Ex

Intrinsically safe flame detector with integrated function test of the optical channels via IR emitter. Aluminum housing.

This detector is also available as a silicone-free version.

3.2.2 Detector type FMX5000 IR Ex ST

Intrinsically safe flame detector with integrated function test of the optical channels via IR emitter. Stainless steel housing.

This detector is also available as a silicone-free version.

3.3 Response behavior

The sensitivity of a flame detector was tested in fire tests in combination with various combustible materials (fuels). The following overview helps you select a suitable flame detector based on flammable liquids or solids

Response sensitivity in percent (detection distance) to n-Heptane standard fire (0.1 m² fire pan, 0.5 liter)

Fuel	FMX5000 IR	FMX5000 UV
Avgas 100 (0.1 m²; 0.5 liter)*	90 %	100 %
Fuel oil / diesel (0.1 m²; 0.5 liter)*	55 %	55 %
Jet A1 (0.1 m²; 0.5 liter)*	65 %	80 %
JP 8 (0.1 m²; 0.5 liter)*	75 %	80 %
n-heptane (0.1 m²; 0.5 liter)	100 %	100 %
BP North Sea crude oil (0.2 m²; 0.5 liter)*	50 %	80 %
Methylated spirits (0.25 m², 1.5 liter)*	100 %	80 %
Gasoline (Super) (0.1 m²; 0.5 liter)*	55 %	80 %
Ethane (28 l/min; 4.0 mm nozzle; 0.5 m flame)*	60 %	100 %
Methane (48 l/min; 6.0 mm nozzle; 0.5 m flame)*	65 %	90 %
Propane (20 l/min; 2.5 mm nozzle; 0.5 m flame)*	55 %	90 %
Hydrogen (20 l/min; 2.5 mm nozzle; 0.2 m flame)*	X	30 %

* This fuel has not been tested by FM Approvals.

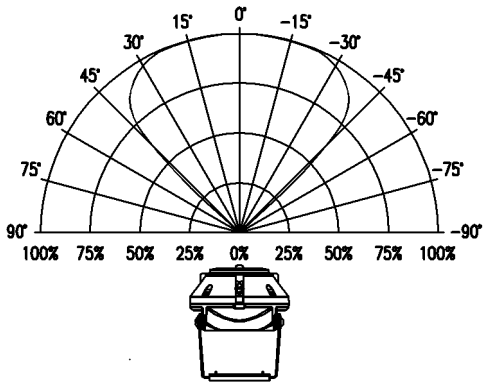
Detection distance solid-material fires

Fuel	FMX5000 IR Class X (50 m)	FMX5000 IR Class 1	FMX5000 IR Class 2	FMX5000 IR Class 3	FMX5000 UV Class 1
Cotton 100 g, fluffed up*	10 m	7.5 m	5 m	x	10 m
Cotton 500 g, fluffed up*	15 m	10 m	x	x	15 m
Beechwood 70 sticks 1 x 2 x 25 cm^3*	30 m	20 m	15 m	x	30 m
Dry magnesium 100 g*	x	x	x	x	20 m
Oily magnesium from compressed tabs with cutting oil*	15 m	x	x	x	20 m
Sulfur powder 300 g fluidized on burner 0.25 x 0.25 m^2 pan*	x	x	x	x	10 m

* This fuel has not been tested by FM Approvals.

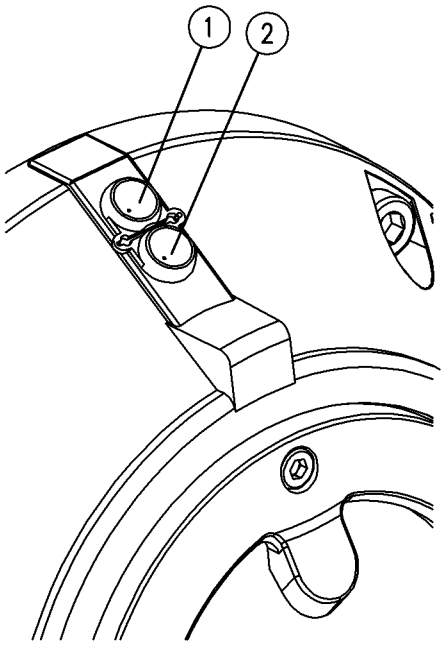
3.4 Viewing range

The viewing range of the detector is shown in the following figure. The relative sensitivity is given (in percent).



FMX5000 IR Ex viewing range

3.5 Status indicators



1 Alarm indicator (red)
2 Operation indicator (green) or fault indicator (yellow)

Fig. 4: FMX5000 IR Ex status indicators

The status indicators show that operation is normal or if an alarm or fault exists.

The detector has a red status indicator as well as a two-color green/yellow status indicator.

Status indicator	Indicator behavior	Description	Miscellaneous
green (operation)	flashes every 10 seconds	Correct operation.	
yellow (fault)	lit	A malfunction exists. The fault line current simultaneously increases by approx. 15 mA.	The fault display is lit only if an alarm is present and only for the duration of the fault. A connected fault line is required for this. Measures in the event of faults ↳ *Chapter 9 “Troubleshooting” on page 68*. Further information on connection of the fault line ↳ *Chapter 9 “Troubleshooting” on page 68*.
red (Alarm)	lit	The detector is in an alarm state. The alarm line current simultaneously increases by approx. 15 mA. If an external indicator is connected (option): The external indicator is triggered.	Further information on connecting the alarm line and external indicators Flame Detector ↳ *Chapter 6.8 “Connect the complete system (control drawings)” on page 48*.

3.6 Alarm signaling

If the alarm condition is met, the internal alarm circuit is activated and an additional alarm current flows. This increase in current allows a connected evaluation unit to recognize that a detector is in an alarm state. The alarm indicator of the detector lights up. The alarm can be configured as latching or non-latching; see ↳ *Chapter 5 “Configuration” on page 31*

INFORMATION

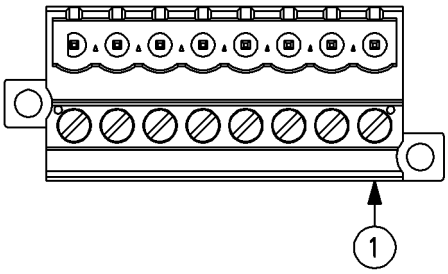
An alarm circuit configured as latching can be reset by briefly switching off the supply voltage. Switching off the supply voltage for a longer period may cause the detector to restart ↳ *Chapter 12.1 “Functional data” on page 74.*

3.7 Fault signaling

If a fault condition is met, the internal fault circuit is activated and an additional fault current flows[1)]. This increase in current allows a connected evaluation unit to recognize that a detector is in a fault state. The fault indicator of the detector lights up. The fault circuit is non-latching. There is no fault signaling during alarm signaling. If an alarm is detected during fault signaling, fault signaling is first turned off or interrupted and then alarm signaling is switched on. Only after the end of alarm signaling are currently pending faults immediately displayed again.

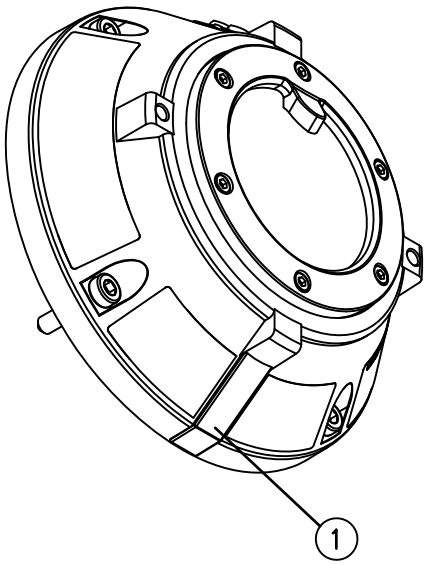
[1)] only with connected fault line

3.8 Test/Reset input and reset switch



1 Test/reset input connecting terminal

Fig. 5: Detector base connecting terminal



1 Reed switch (inside)

Test triggering can be initiated and then reset via the "T/R" (test/reset input) connecting terminal (Fig. 5) in the detector base or via the reed switch (Fig. 6/1) in the detector:

- The test is triggered via the "T/R" connecting terminal by pressing the test/ reset button (Fig. 28/8).
- The test is triggered via the reed switch by holding a permanent magnet against the switch.

For more information, .

Fig. 6: FMX5000 IR Ex reed switch

3.9 Note on the DIP switch

The detector can be configured via the DIP switch (Fig. 2/3).

For more information, see *Chapter 5 “Configuration” on page 31*.

3.10 Temperature measuring pad

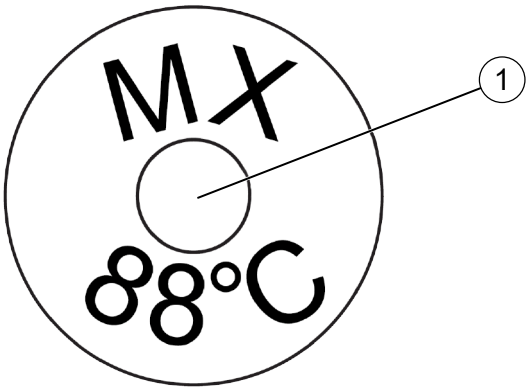


Fig. 7: Temperature measuring pad

1 Dot on temperature measuring pad with permanent change in color

The dot is white when delivered (Fig. 7/1). If the dot has a dark color, the detector was operated, stored, or transported above the maximum operating or storage temperature ↳ *Chapter 9 “Troubleshooting” on page 68*.

3.11 Device markings

3.11.1 Nameplate FMX5000 IR Ex

The nameplate (on the rear of the detector) contains at least the following information:

Manufacturer and address	Minimax GmbH D-23840 Bad Oldesloe
Detector type	UniVario FMX5000 IR Ex
CE marking	CE

3.11.2 Nameplate on FMX5000 IR Ex

The nameplate of the FMX5000 IR Ex (on the outside of the detector) contains at least the following information:

Manufacturer and address	Minimax GmbH D-23840 Bad Oldesloe
Detector type	UniVario FMX5000 IR Ex
CE marking	CE 0158
Explosion protection marking, category 2G (gas)	Ex II 2G Ex ia IIC T4 Gb
	Ex II 2G Ex ia IIC T6 Gb
Explosion protection marking, category 1D (dust)	Ex II 1D Ex ia IIIC T_{200} 95°C Da
	Ex II 1D Ex ia IIIC T_{200} 105°C Da
Number of type examination certificate	BVS 12 ATEX E 088
IECEx certificate	IECEx BVS 12.0056
Year of manufacture	2023
FM approval	Zone 1, AEx ia IIC T6...T4 Gb Zone 20, AEx ia IIIC T_{200} 95°C Da Zone 20, AEx ia IIIC T_{200} 105°C Da CLASS I, II, III, DIV 1, GRP A, B, C, D, E, F, G T6...T4
Ambient temperature Ta	T6: -40°C ≤ Ta ≤ 40°C T4: -40°C ≤ Ta ≤ 80°C T_{200} 95°C: -40°C ≤ Ta ≤ 70°C T_{200} 105°C: -40°C ≤ Ta ≤ 80°C

3.11.3 Nameplate on FMX5000 IR Ex ST

The nameplate of the FMX5000 IR Ex ST (on the outside of the detector) contains at least the following information:

Manufacturer and address	Minimax GmbH D-23840 Bad Oldesloe
Detector type	UniVario FMX5000 IR Ex ST
CE marking	CE 0158

Explosion protection marking, category 1G (gas)	⟨Ex⟩ II 1G Ex ia IIC T4 Ga ⟨Ex⟩ II 1G Ex ia IIC T6 Ga
Explosion protection marking, category 1D (dust)	⟨Ex⟩ II 1D Ex ia IIIC T_{200} 95 °C Da ⟨Ex⟩ II 1D Ex ia IIIC T_{200} 105 °C Da
Number of type examination certificate	BVS 12 ATEX E 088
IECEx certificate	IECEx BVS 12.0056
Year of manufacture	2023
FM approval	Zone 0, AEx ia IIC T6...T4 Ga Zone 20, AEx ia IIIC T_{200} 95°C Da Zone 20, AEx ia IIIC T_{200} 105°C Da CLASS I, II, III, DIV 1, GRP A, B, C, D, E, F, G T6...T4
Ambient temperature Ta	T6: -40°C ≤ Ta ≤ 40°C T4: -40°C ≤ Ta ≤ 80°C T_{200} 95°C: -40°C ≤ Ta ≤ 70°C T_{200} 105°C: -40°C ≤ Ta ≤ 80°C

3.12 Detector base

The detector bases described below can be used for this detector type.

3.12.1 UniVario® MX5000 detector base

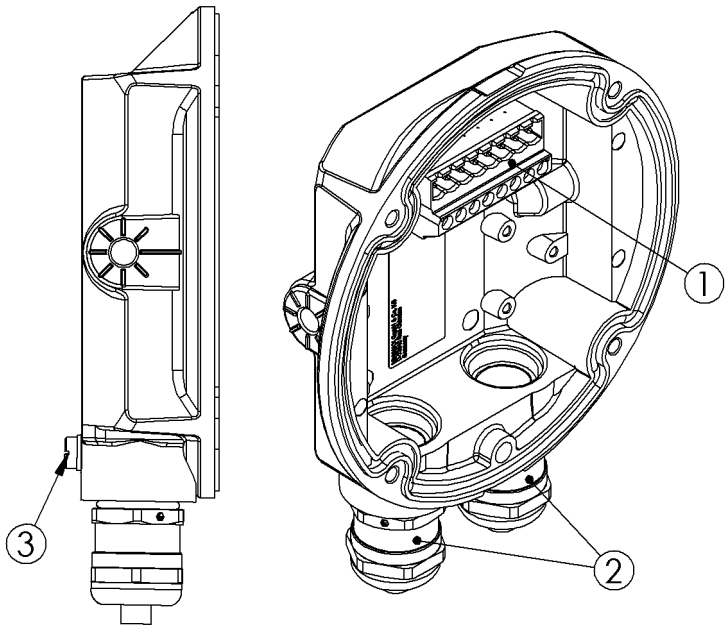


Fig. 8: MX5000 M20 Ex detector base

1 Terminal block (8-pole)
2 Cable entry with cable gland
3 Potential equalization terminal (Ex variants only)

Detector base	Cable gland	Cable diameter	Equipotential bonding terminal
MX5000 Ex	M16 x 1,5 Ex (2 pcs)	6 mm ... 8 mm (0.24 in ... 0.31 in)	yes
MX5000 Ex ST [2)]	M20 x 1,5 Ex (2 pcs)	7 mm ... 12 mm (0.28 in ... 0.47 in)	yes
MX5000 M20 Ex	M20 x 1,5 Ex (2 pcs)	7 mm ... 12 mm (0.28 in ... 0.47 in)	yes
MX5000 NPT	- none - (1/2 in. - 14 NPT thread) [1)])	- none -	yes
MX5000 M20 NG Ex	- none - M20 x 1,5 thread	- none -	yes

[1)] In accordance with ANSIANSI B 1.20.1

[2)] This detector base is a stainless steel version which may ONLY be used for the UniVario® stainless steel detector "ST".

The MX5000 Ex detector base has a terminal block (Fig. 8/1) and (Fig. 23) and two certified cable entries (Fig. 8/2) with M16 cable glands as well as an external equipotential bonding terminal.

INFORMATION

These detector bases are made of aluminum and may NOT be used for the UniVario® stainless steel detector "ST".

3.12.2 UniVario® MX5000 Ex ST detector base

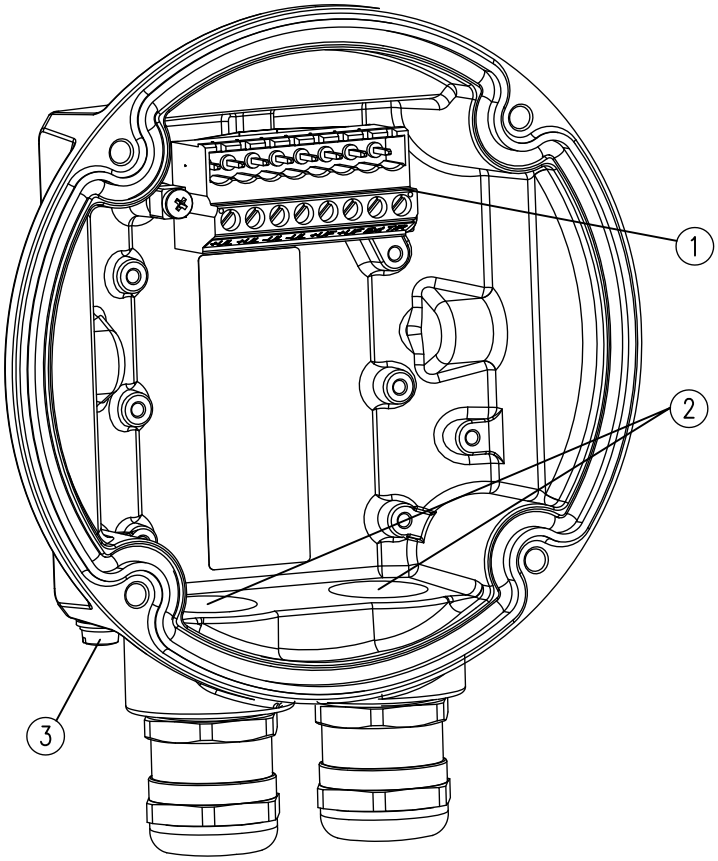


Fig. 9: MX5000 Ex ST detector base

1 Terminal block (8-pole)
2 Cable entry with cable gland
3 Equipotential bonding terminal

The MX5000 ST detector base has a terminal block (Fig. 9/1 and Fig. 23) and two cable entries (Fig. 9/2) with M20 cable glands as well as an external equipotential bonding terminal (Fig. 9/3).

INFORMATION

This detector base is made of stainless steel and must ONLY be used for UniVario® stainless steel detectors "ST".

3.13 UniVario® KMX5000 AP Ex communication module (option)

Individually addressable detector loop operation with an Apollo XP95-compatible protocol is possible with the communication module ↳ *Chapter 10.3 “Communication interfaces” on page 70*. The KMX5000 AP Ex has no isolator.

INFORMATION

With the communication module installed, conventional transmission of state conditions by the detector's current rise technology is deactivated! In this case, the states are transmitted to the control panel by loop protocol.

For more information on assembly and addressing the communication module, ↳ *Chapter 6.9 “UniVario® KMX5000 AP Ex communication module” on page 55*.

3.14 Self-monitoring

The detector tests itself at regular intervals and checks the most important functions:

- Operating voltage
- Function of the optical channels via integrated IR emitters
- Integrity of the storage content in the microcontroller
- Function of clock generator
- Function of the integrated AD converter
- Adherence to allowable detector operating temperature range
- Function and setting of DIP switch

If the self-monitoring system detects a fault, the operation indicator no longer flashes and the fault indicator (Fig. 4/2) comes on. For more information, ↳ *Chapter 9 “Troubleshooting” on page 68*.

INFORMATION

The yellow fault indicator lights up only when there is no alarm present and when the fault line is connected.

INFORMATION

A light pulse is transmitted approximately every 90 seconds via the integrated IR emitter. This light pulse is transmitted even when the optical test is deactivated.

INFORMATION

The maximum reaction time to a soiled optical system is 10 minutes.

4 Project planning information

- Coordinate the number of detectors with the area to be monitored and the kind of event to be detected. Where appropriate, observe any applicable national regulations and laws.
- KMX5000 AP Ex communication module (option): Give consideration to detector-type restrictions of the loop used during the system configuration.

4.1 Maximum number of detectors on a detector line

The maximum number of detectors that can be operated for each detector line depends on the terminal resistance as well as the alarm and short circuit thresholds. Give consideration to power consumption during an alarm as well. The system must be made using conductor cross-sections of between 0.5 and 2.5 mm² (AWG 21 to AWG 14). The conductor cross-section should be based on the number of detectors to be connected, the supply voltage and the cable length. The supply voltage must correspond with the technical data.

NOTICE

(No) operation in intrinsically safe circuits:
FMX5000 IR Ex flame detectors with ignition protection category "intrinsic safety" must be operated in intrinsically safe circuits using certified safety barriers (U_{max} ≤ 28 V, I_{max} ≤ 100 mA, P_{max} ≤ 1.2 W) located outside the explosion hazard area.

4.2 Classification

In accordance with EN54-10, detectors in various classes must detect a n-Heptane fire 33 cm x 33 cm (13 in x 13 in) in size (surface of approx. 0.1 m² (1.08 sq ft)) from various distances within 30 seconds.

- Class 3: max. 12 m (13.12 yd)
- Class 2: max. 17 m (18.59 yd)
- Class 1: max. 25 m (27.34 yd)
- Class X (50 m): max. 50 m (54.68 yd)

Further information on configuration ↬ *Chapter 5 “Configuration” on page 31*.
Fire detection follows the inverse-square law. If the distance from the detector is doubled, the fire must be four times larger in order to be detected.

The minimum surface area of a fire that should be detected with certainty from a given distance can be determined using the inverse-square law. The following figure shows the distances and corresponding surface areas. A distance of 50 m (54.68 yd) should not be exceeded.

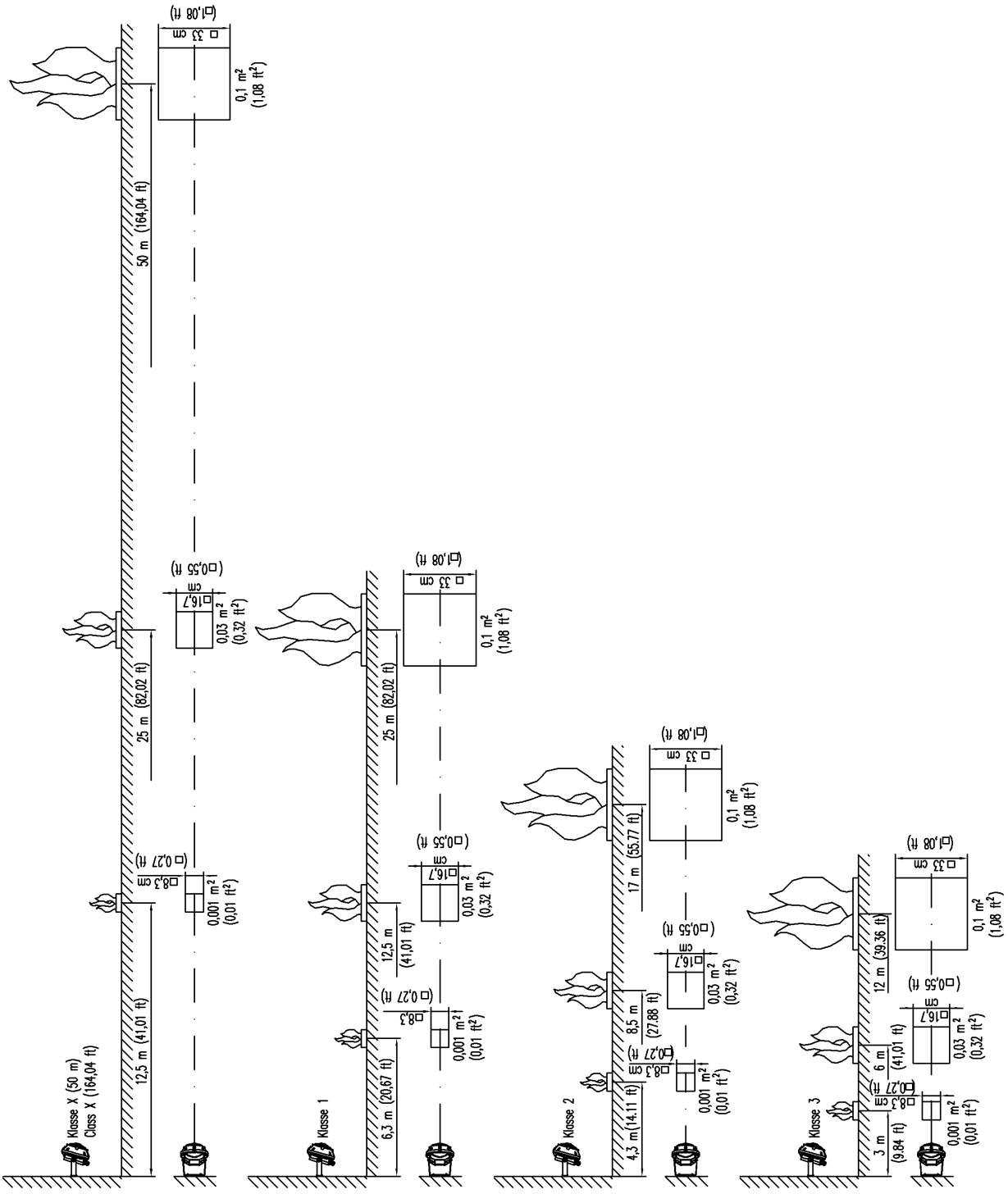


Fig. 10: Classification

NOTICE

False alarm due to too high fire sensitivity
The detector class should only be set as sensitive as is necessary in order to avoid false alarms.

4.3 Room monitoring as per VdS 2095: 2010-05 (07)

In a rectangular room the detector must be aligned at an angle of 45° between the optical axis and wall.

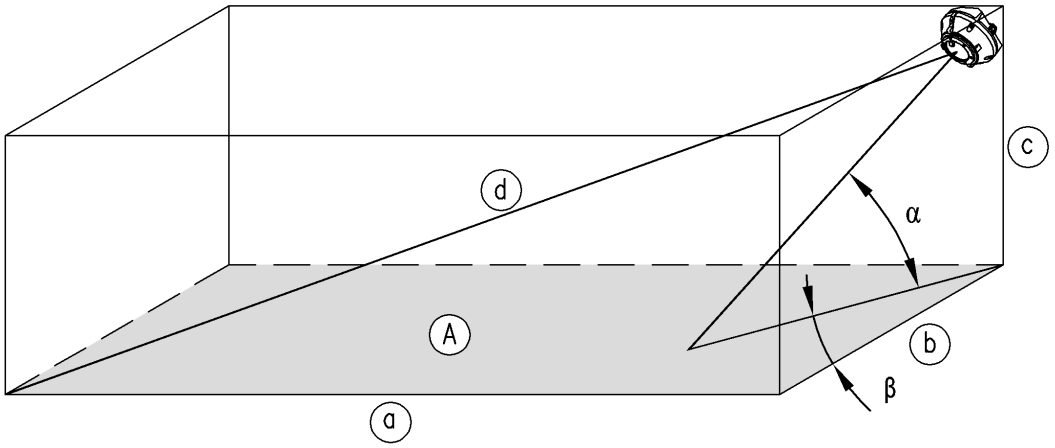


Fig. 11: Room monitoring as per VdS 2095: 2010-05 (07)

Flame detector class	Maximum edge length of room (a, b, c)	Longest path to the most distant point in room (d)	Maximum surface area to be monitored (A)
1	26 m (85 ft)	45 m (148 ft)	676 m^2 (7276 sq ft)
2	20 m (65 ft)	33 m (108 ft)	400 m^2 (4305 sq ft)
3	13 m (43 ft)	23 m (75 ft)	169 m^2 (1819 sq ft)

Tab. 1: Room monitoring as per VdS 2095: 2010-05 (07)

Observe the national regulations and standards applicable in each country of use!

4.4 Sources of interference

In order to prevent false alarms, the detectors should not be used in areas where sources of interference are anticipated.

Sources of interference which can trigger an alarm are:

- Warm, turbulent air circulation near the optical system of the detector
- Exhaust gas or air containing carbon monoxide/CO_2 in the viewing range of the detector
- High-energy sources of interference which override the sensor system
- Welding
- Powerful sources of IR radiation
- Several sources of interference combined

The inverse-square law also applies to sources of disturbance!

If the radiative heat transfer of a modulated source of interference is considerably larger than the radiative heat transfer of a fire to be detected, then detection is delayed considerably or does not take place at all. Warm air circulating near the detector or air with higher concentrations of carbon monoxide and/or CO_2 such as exhaust gas should be avoided within the detector viewing range. If it is not possible to entirely avoid these sources of interference, then it is important to set the detector to low sensitivity (to Class 3 or Class 2).

The detector does not respond to:

- Solar radiation (direct, reflected and/or modulated)
- Sources of light such as fluorescent lamps, light bulbs, LEDs and energy-saving lamps (direct, reflected and/or modulated)

As a general rule: The more modulated radiation due to sources of interference present, the longer the delay before an alarm is set off, making a false alarm more likely.

INFORMATION

The fault sensitivity of the detector may increase if the optical system is contaminated unevenly. The formation of dew or droplets on the optics may impair detection capability and cause faults (optical test failure).

4.5 Impairment of fire sensitivity

- If the detector is behind panes, fire detection is not possible because (nearly) all materials attenuate the wavelengths needed for detection. **Operating the detector from behind a pane is prohibited!**
- If a coat of dirt such as dust or condensation forms on the optical system, radiative heat transfer is attenuated. With the optics test switched on, the detector monitors the pane of the optical system and gives a fault signal if attenuation is too strong.
- A high proportion of carbon monoxide or CO_2, gases, vapors, extreme humidity or also fog and rain attenuate certain wavelengths required for fire detection.
- If modulated sources of disturbance are present in the viewing range of the detector, fire detection may be delayed or fires may not be detected at all.
- At an angle of 45°, sensitivity is reduced by half and thus the largest possible distance from a fire.

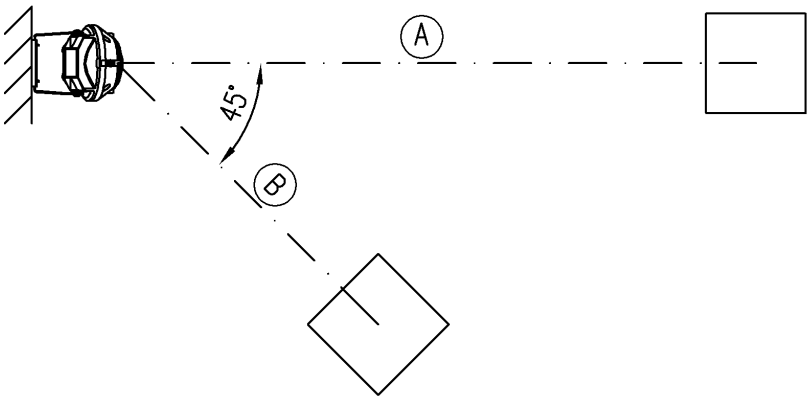


Fig. 12: Sensitivity is reduced by half at an angle of 45°

NOTICE

Hot surfaces in the detector viewing range can prevent fire detection.
At minimum, maintain a distance of 5 m (16 ft) between hot surfaces (e.g. electrical resistance heaters, fan heaters, radiators) and the detector.

5 Configuration

Have the work described in this section carried out only by the following persons:

Personnel: ■ Qualified specialist personnel

5.1 DIP switch

DIP switch settings on the detector:

- Setting the configuration

DIP switch settings on the KMX5000 AP communication module:

- Addressing the detector for loop operation *Chapter 6.9.3 “Address communication module” on page 56*

Explanation of the DIP switch settings shown in the following tables:

DIP switch	Meaning
X	DIP switch position of no significance
2	If a digit is shown: The corresponding DIP switch is in the ON position (here: DIP switch 2)
-	DIP switch in OFF position

5.1.1 Example of switch position

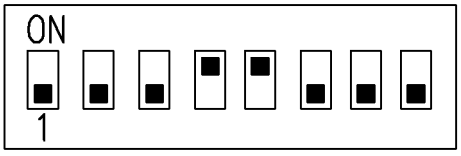


Fig. 13: Example of DIP switch position

DIP switch	Meaning	Configuration/fire sensitivity
---45---	DIP switch 1 in OFF position	Reed switch active
---45---	DIP switch 2 in OFF position	Latching alarm
---45---	DIP switch 3 in OFF position	Not currently used
---45---	DIP switch 4 in ON position	Optics test switched off
---45---	DIP switch 5 in ON position DIP switch 6 in OFF position DIP switch 7 in OFF position DIP switch 8 in OFF position	Fire sensitivity setting, here Class 1

5.2 Carry out configuration

DIP switches 1 to 4: Configuration setup

DIP switch 12345678	Meaning
-XXXXXXX	Reed switch active
1XXXXXXX	Reed switch inactive
X-XXXXXX	Alarm latching during limit value operation / Discovery during loop operation
X2XXXXXX	Alarm non-latching during limit value operation / XP95 during loop operation
XX-XXXXX	Not currently used
XX3XXXXX	Not currently used
XXX-XXXX	Optics test is switched on or switched off via SMX5000
XXX4XXXX	Optics test is switched off

5.3 Set response behavior

DIP switches 5 to 8: Set response behavior

DIP switch 12345678	Meaning
XXXX----	Fire sensitivity configuration via SMX5000
XXXX5678	Fire sensitivity configuration via SMX5000
XXXX5---	Fire sensitivity in accordance with EN54 class 1
XXXX-6--	Fire sensitivity in accordance with EN54 class 2
XXXX56--	Fire sensitivity in accordance with EN54 class 3
XXXX--7-	Fire sensitivity in accordance with EN54 class X (50 m)

INFORMATION

An impermissible setting causes a fault signal. In this case fire sensitivity Class 1 is activated.

6 Installation

Have the work described in this section carried out only by the following persons:

Personnel: ■ Qualified specialist personnel

6.1 Safety

The assembly and installation work described below requires that all project planning documents for the complete system as well as for the respectively valid national regulations and laws be observier, for installations in explosion hazard area e.g. IEC 60079-14.

6.2 Preparation for installation

- Project planning documents for the complete system must be observed in all installation work.
- Before installing the detector, make sure all information on the nameplate matches the project planning documents ↳ *Chapter 3.11 “Device markings” on page 20*. The detector must correspond with the project planning requirements.
- Observe the maximum operating temperature of the detector.
- An upward angle of the detector should be avoided because this may allow contamination to accumulate on the optical system.
- The viewing range of the detector should not face toward sources of interference. The largest possible distance should be maintained from sources of interference.

6.3 Carrying out the installation

When installing in areas with aggressive media (e.g. grinding oil in machine tools):

- Lay an appropriate cable loop to allow these materials to be conveyed away from the detector.

For installation with more demanding seal tightness requirements (e.g. outdoor applications or in an area contaminated with oil):

- Use recommended cables ↳ *Chapter 10.5 “Recommended connection cables” on page 71*.
- Use recommended shrinkable tube ↳ *Chapter 10.7 “Special accessories” on page 72*.

Make sure dust particles (greater than 10 mm) cannot accumulate on the housing. The formation of dust, dew or droplets on the optical system impairs detection capability and causes faults (optical test failure).

INFORMATION

The FMX5000 IR Ex ST is only suitable for assembly with the MX5000 mounting bracket.

6.4 Preparation for assembly

The assembly location has been specified based on the configuration documents.

The detector has been configured in accordance with the configuration requirements ↳ *Chapter 4 “Project planning information” on page 26*.

The configuration parameters have been entered on the setting plate (↳ *Chapter 5.3 “Set response behavior” on page 32*).

INFORMATION

The detector base can remain covered with a dust cap MX5000 until the detector is fitted ↳ Chapter 10 “Accessories and spare parts” on page 70.

6.5 Carrying out the assembly

Assembly can be carried out according to the assembly variants described below.

6.5.1 Bracket mounting

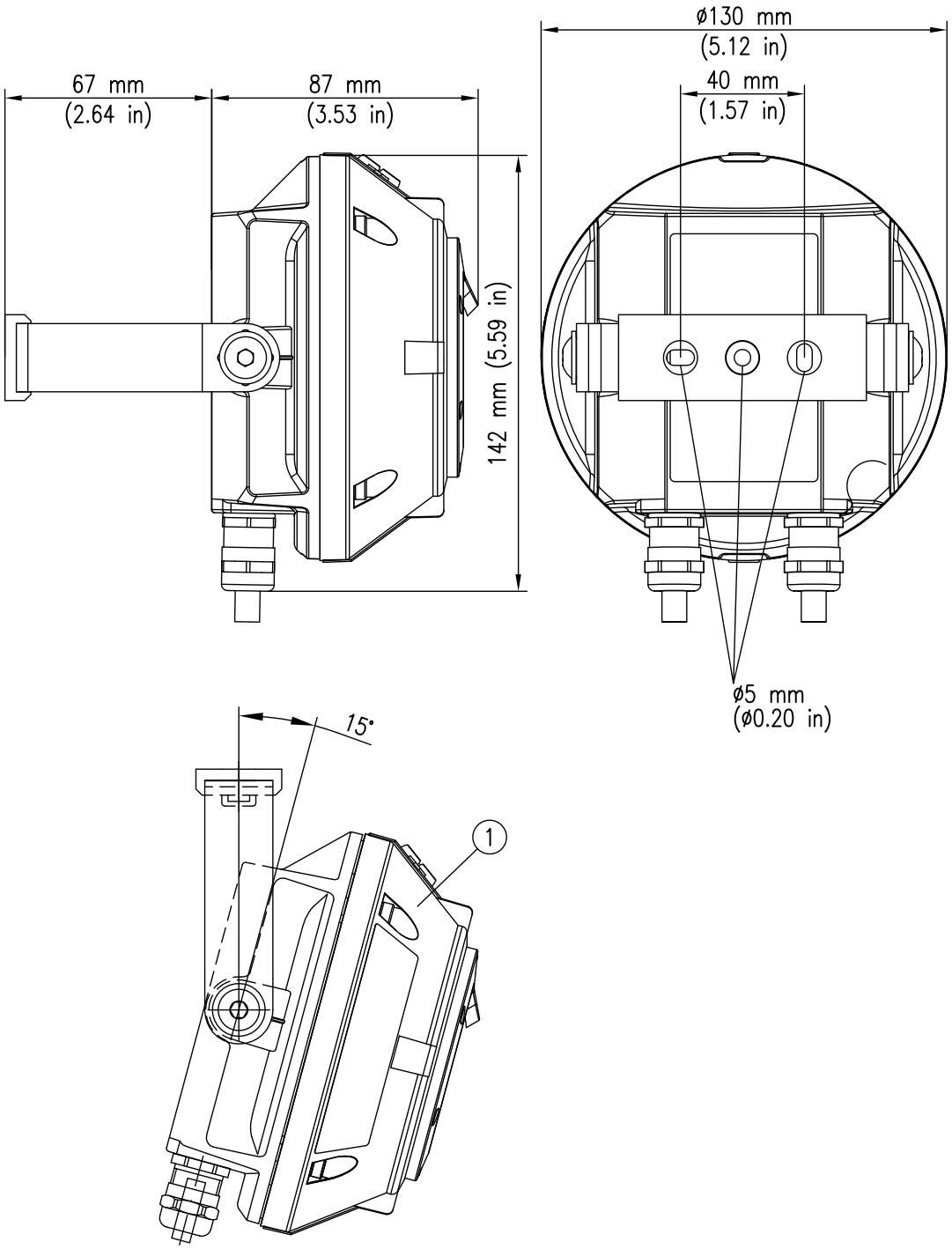
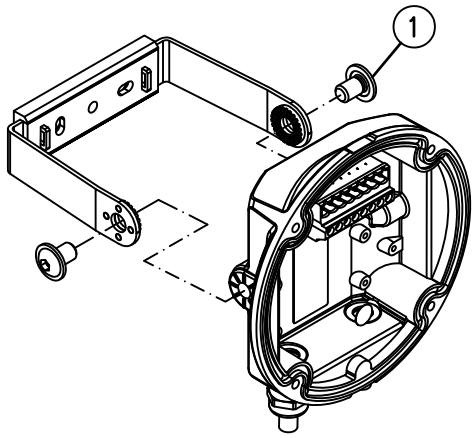


Fig. 14: FMX5000 IR Ex – Device and assembly dimensions and bracket mounting inclination angle

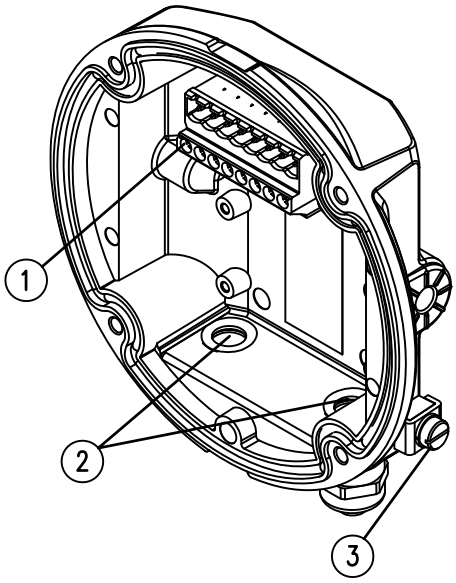
1 Detector is adjustable in 15° increments



1 Bracket screws

Fig. 15: MX5000 Ex detector base for bracket mounting

1. Drill the holes required for the mounting of the bracket. Be sure to observe the dimensions and pivot area of the detector.
2. Mount the bracket with the suitable fastening materials.
3. Screw the bracket to the detector base using the bracket screws (Fig. 15/1) supplied. The cable entries on the detector base should face down.
4. Feed the connection cable through the cable entry (Fig. 16/2) into the detector base and connect to the terminal block (Fig. 16/1). For more information, ↬ *Chapter 6.6 “Electrical connection” on page 43*.
5. Use the supplied plugs to seal off any unused cable entries.
6. Place the detector (Fig. 17/3) onto the detector base (Fig. 17/2). The terminal block (Fig. 17/1) must fit into the terminal strip on the detector. The cable entries on the detector base should face down.
7. Screw the detector and detector base together with the screws (Fig. 17/4) supplied. Tighten the screws crosswise using an Allen key (size 4 mm, 3.5 Nm) in order to ensure seal tightness.



1 Terminal block
2 Cable entry
3 Equipotential bonding terminal

Fig. 16: MX5000 Ex detector base

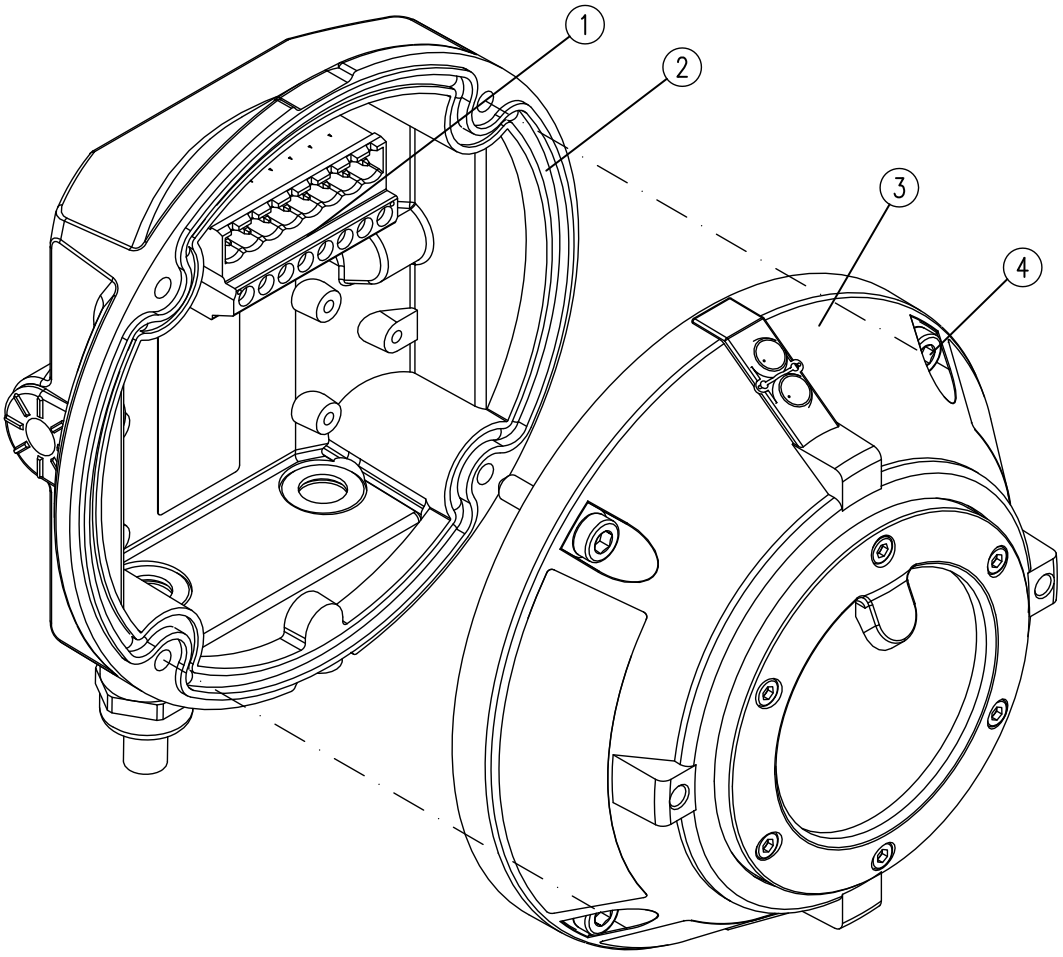


Fig. 17: Screw the FMX5000 IR Ex to the detector base

1 Terminal block
2 Detector base
3 Detector
4 Screws

6.5.2 Assembly with mounting bracket

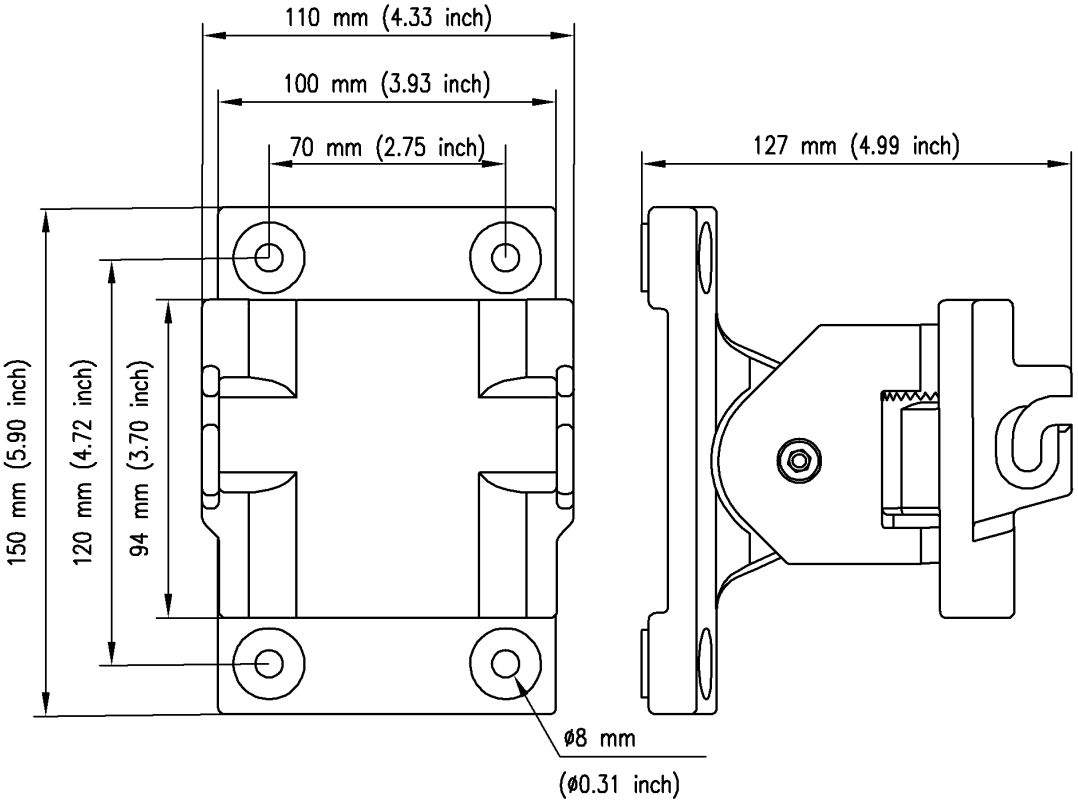


Fig. 18: Assembly dimensions of MX5000 ST mounting bracket

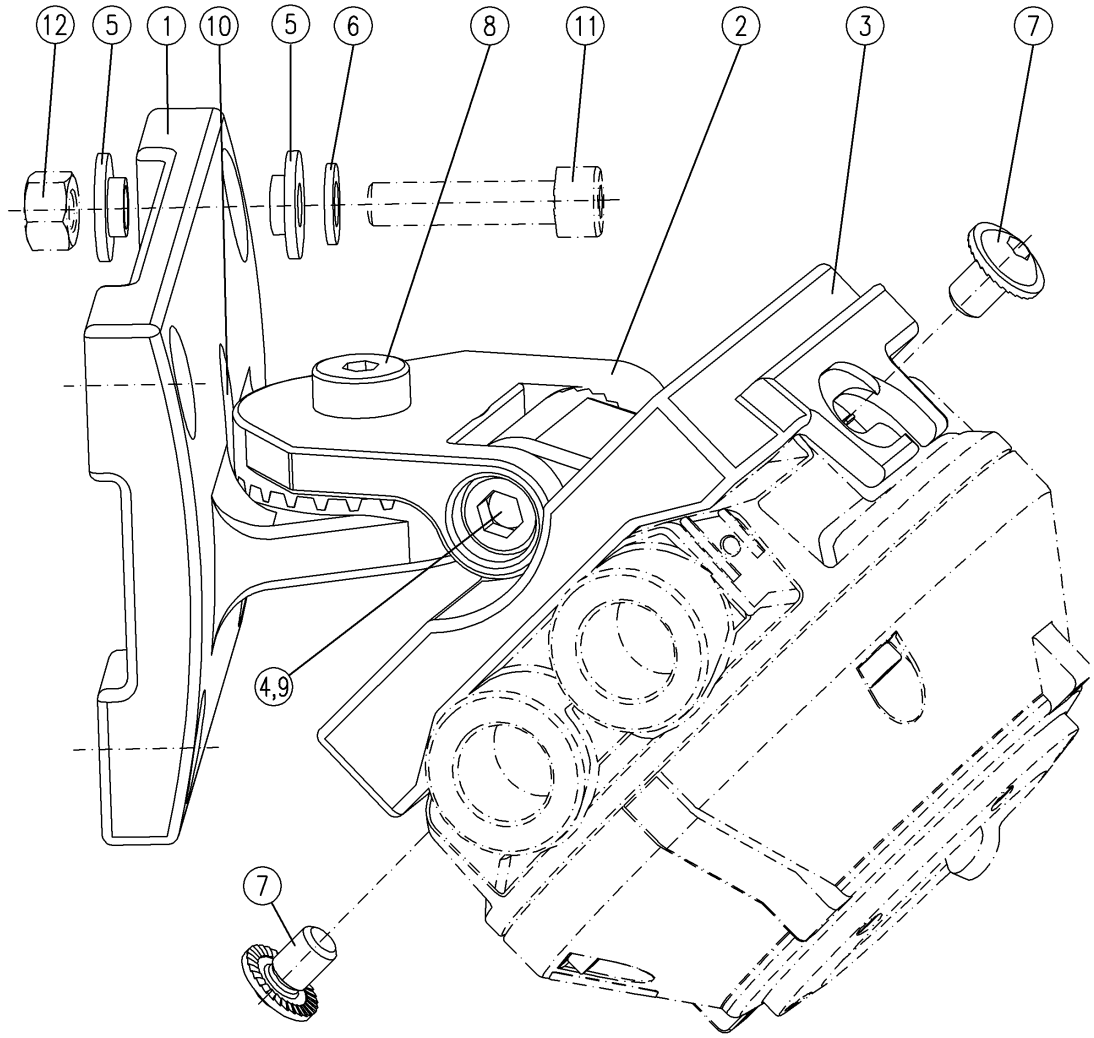


Fig. 19: Assembly of MX5000 ST wall mounting bracket

1 MX5000 ST wall mounting bracket
2 Pivot arm of MX5000 ST mounting bracket
3 Mounting for MX5000 ST mounting bracket
4 Socket head screw ISO 4762-M10x55-A4
5 Bushing for MX5000 wall bracket
6 Washer ISO 7092-8 4-A4
7 Screw M8x12 for MX5000 ST bracket
8 Screw DIN 6912-M12x30-A4
9 Loctite 243 [1)]
10 Recess for pivot arm
11 Screws M8-A4 [1)]
12 Nuts M8-A4 [1)]

[1)] Not included in scope of supply

1. Install wall mounting bracket (1) according to the situation at the installation location. For insulated installation, use bushings MX5000 (5). Install the wall mounting bracket vertically so that the recess for the pivot arm (10) is on the left.
2. The four bores are designed for M8 screws stainless steel A4 ISO 4762 (11) [1] with washers ISO 7092-8,4-A4 (6) and nuts M8-A4 (12) [1]. With this connection, coat the screw threads with Loctite 243 (9) [1] and tighten using an Allen key (size 6 mm; 16 Nm (11.8 ft lb)) and ring or socket spanner (size 13 mm).
3. Align pivot arm of MX5000 ST mounting bracket (2). Coat thread of screw DIN 6912-M12x30-A4 (8) with Loctite 243 and tighten using an Allen key (size 10 mm; 56 Nm (41.3 ft lb)).
4. Align mounting for MX5000 ST mounting bracket (3). Coat thread of socket head screw ISO 4762-M10x55-A4 (4) with Loctite 243 and tighten using an Allen key (size 8 mm; 32 Nm (23.6 ft lb)).
5. Insert detector into wall mounting bracket (1). Coat thread of screws M8x12 (7) for mounting the detector with Loctite 243 and tighten using an Allen key (size 5 mm; 16 Nm (11.8 ft lb)).

[1] Not included in scope of supply (optional)

NOTICE

The curing time of Loctite 243 on steels is 12 hours.

6.5.3 Bracket mount installation

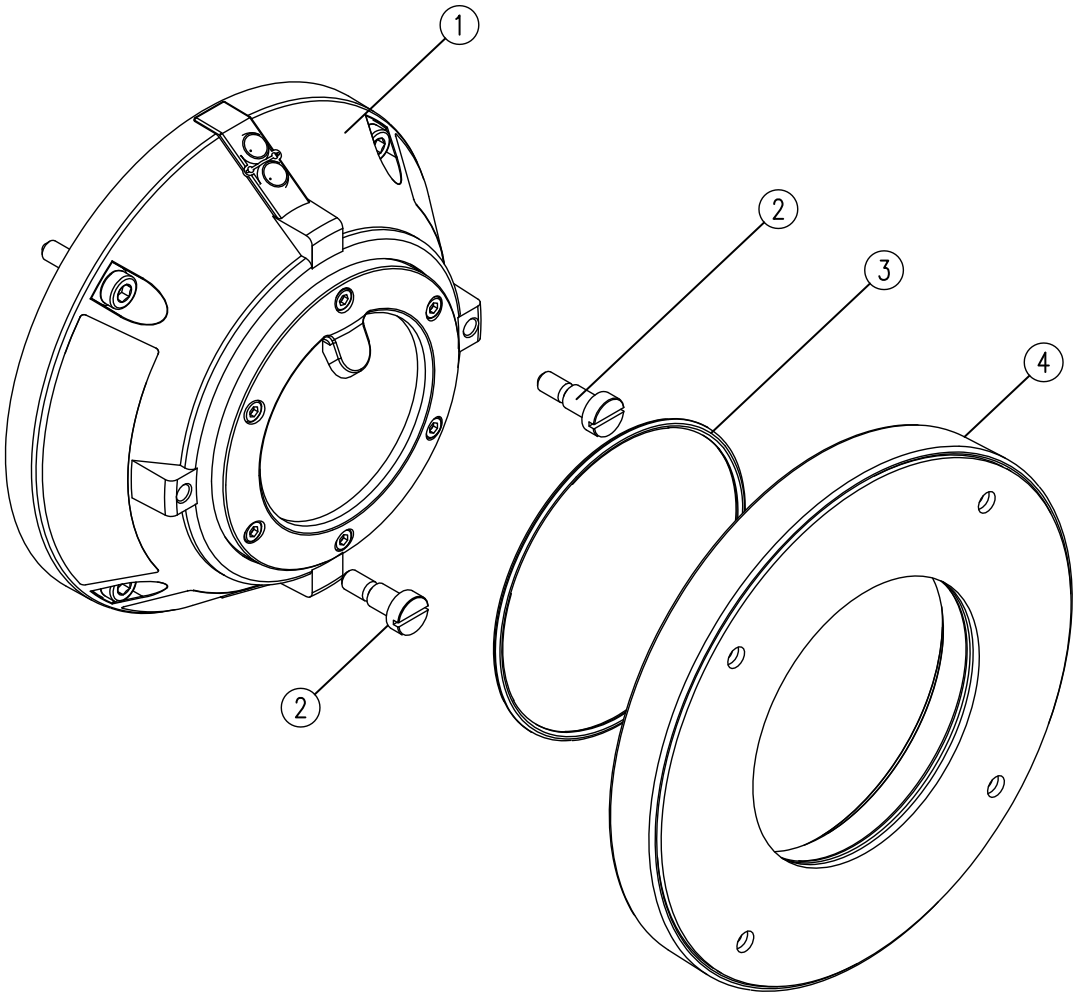


Fig. 20: FMX5000 IR Ex bracket mount installation

1 Detector
2 M5 screws
3 O-ring
4 MX5000 console

1. Drill the holes required for installing the console. Use the console as a drilling template. Observe the dimensions of the console (Fig. 20/4) and the detector.
2. Install the console onto the object to be monitored using the supplied tapping screws, supplied blind rivets or other suitable fastening materials.
3. Screw the M5 screws (Fig. 20/2) supplied into the detector (Fig. 20/1).
4. Insert the connection cable through the cable entry into the detector base and connect to the terminal block *Chapter 6.6 “Electrical connection” on page 43*.
5. Use the supplied plugs to seal off any unused cable entries.

6. Place the detector (Fig. 17/3) onto the detector base (Fig. 17/2). The terminal strip of the detector must be inserted into the terminal block (Fig. 17/1). The cable entries on the detector base should face down.
7. Screw the detector and detector base together with the screws (Fig. 17/4) supplied. Tighten the screws crosswise using an Allen key (size 4 mm, 3.5 Nm) in order to ensure seal tightness.
8. High seal tightness requirements: Insert the O-ring (Fig. 20/3) supplied into the console groove.
9. Place the detector onto the console and lock into place with the bayonet catch. The detector must be firmly attached to the console.

   If it is not possible to lock the detector onto the console without tools:

10. Back off the M5 screws (Fig. 20/2) in the detector by about one turn, place the detector back onto the console and lock into place with the bayonet catch.

NOTICE

The MX5000 F console consists of conducting antistatic plastic.
If assembly is not with electrical insulation, the detector housing must be included in the equipotential bonding. When using shielded cabling, ensure that the same equipotential bonding is present throughout the entire cable guide.

6.6 Electrical connection

6.6.1 General connection instructions

⚠ CAUTION

Risk of injury from electric shock!
Touching live parts can cause an electric shock and result in injuries.
- Switch off the supply voltage to the detector before starting any connection and assembly work.

⚠ WARNING

Explosion hazard from electrostatic charging!
Electrostatic charges can cause explosive atmospheres to ignite and electronic components can be damaged.
- During all work, ensure a safe equipotential bond between persons, place of work and device/control panel/detector.
- If installation is without electrical insulation: Include the detector housing in equipotential bonding.
- When using shielded cabling: Ensure that the same equipotential bonding is present throughout the entire cable guide.
- Ensure that there is no explosion hazard during the connection work.

- Intrinsically safe fire detectors must be connected to safety barriers that are located outside the explosion hazard area.
- If a fault line is used, an additional safety barrier must be used.
- Only use certified safety barriers with $U_{max} \leq 28$ V, $I_{max} \leq 100$ mA, and $P_{max} \leq 1.2$ W. Install the safety barrier according to the manufacturer's instructions. When choosing a safety barrier, pay attention to the required explosion group.
- Observe the information on the nameplates of the safety barrier. The max. permissible capacitance and inductance in connection with the ignition group must, in particular, be observed when choosing the cable type, the cable length and the connected detectors (for capacitance [Ci] and inductance [Li], see Section 12.3 Electrical data).
- When using grounded safety barriers, ensure that the same equipotential bonding is present throughout the entire cable guide.
- Cabling of the intrinsically safe detectors takes place with accordingly marked cables.
- The cable insulation must extend all the way to the connecting terminal. Do not damage the cable when stripping off insulation.
- The maximum permissible cable temperatures must not be exceeded. Choose suitable cables. Choose a suitable laying method.
- Observe the maximum line lengths and maximum voltage drop on the line impedance ↳ *Chapter 6.6.2 “Maximum terminal resistance” on page 44*.
- Connect a leaded metal layer resistor with sufficient performance as end-of-line resistor (EOL) in the last detector of a detector line ↳ *Chapter 6.8 “Connect the complete system (control drawings)” on page 48*, if this is necessary for wire break detection.
  Adapt the resistance to the line voltage and the necessary current in accordance with the specification of the fire alarm control panel or evaluation unit.

6.6.2 Maximum terminal resistance

⚠ CAUTION

Malfunction due to excessive line resistance!
The line resistance of the connection cable must remain so small that in each operating state of the entire fire detector line a fire detection message can always be safely reported to the evaluation unit.

Work with extreme care when dimensioning the connection cables. The conductor cross-section must have been determined during project planning based on

- the number of detectors to be connected,
- the supply voltage and
- the cable length

and a correspondingly suitable cable chosen ↳ *Chapter 10.5 “Recommended connection cables” on page 71*.

- Check if the connection cable selected is in compliance with the project planning directives and regulations.

Also observe the following:

- The maximum line resistance can be limited by the evaluation unit used and must never be exceeded. Information on the maximum line resistance can be found in the operating manual of the evaluation unit.
- For alarm currents which are switched on: The additional voltage drop on the line impedance must not cause the voltage on the detector terminals to fall below the permitted level.
- If the detector line is monitored for short-circuits: The total current must never exceed the short circuit threshold.

INFORMATION

The total current is the total of all currents together. This can be from
- *the quiescent currents of the detectors,*
- *the current via the end-of-line resistor at the end of the line,*
- *the alarm currents of all detectors which can switch to an alarm state simultaneously.*

INFORMATION

The maximum number of detectors that can be operated for each detector line depends on the terminal resistance as well as the alarm and short circuit thresholds.
Give consideration to power consumption during an alarm as well.
The system must be made using conductor cross-sections of between 0.5 and 2.5 mm² (AWG 21 to AWG 14).
The conductor cross-section should be based on the number of detectors to be connected, the supply voltage and the cable length.
The supply voltage must correspond with the technical data.

6.7 Preparation of cable connection

INFORMATION

Shielded cabling for the detector is not mandatory. However, the connection conditions of the evaluation unit used might require this. Check the operating manual of the evaluation unit.

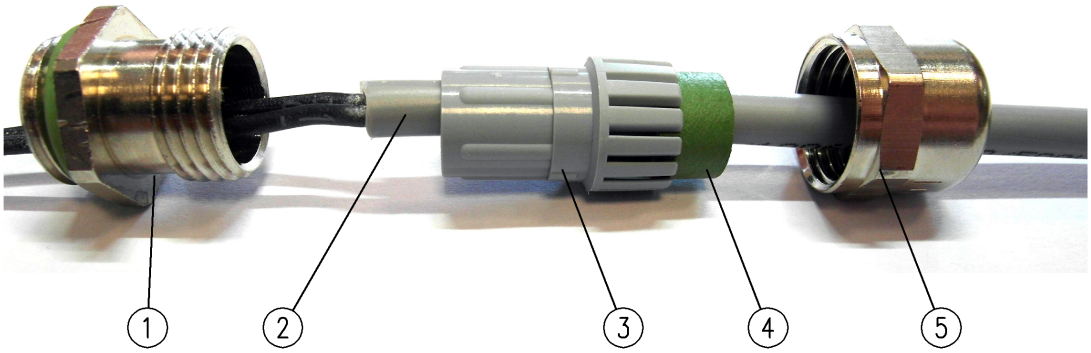


Fig. 21: Cable gland unshielded, example M16x1,5

1 Intermediate fitting
2 Cable sheath
3 Plastic insert
4 Seal
5 Union nut

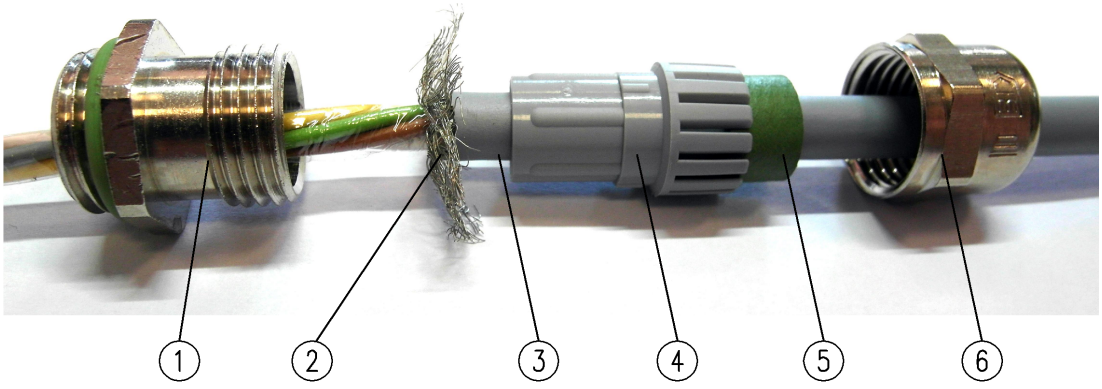


Fig. 22: Cable gland shielded, example M16x1,5

1 Intermediate fitting
2 Shield
3 Cable sheath
4 Plastic insert
5 Seal
6 Union nut

6.7.1 Fasten the cable gland and cable shield

For the procedure described below, see Fig. 21 and Fig. 22.

INFORMATION

In the following description and in the Fig. 21 and Fig. 22, the M16 x 1.5 cable gland is described as an example. Other cable glands can deviate from this.

1. Remove the cable gland union nut and plastic insert with seal from the detector base.
2. Slide the union nut onto the connection cable.
3. Slide the plastic insert with seal onto the connection cable.
4. Strip the cable insulation to the required connection cable length (approx. 100 mm (3.94 in)).
   ⇨ For unshielded cables, steps 5, 6 and 8 can be skipped.
5. Remove the shield up to approx. 10 mm (0.39 in) from the end of the outer sheath. If using a cable with static shield consisting of aluminum-clad plastic foil and sheath wire (e.g. fire detection cable): Remove the plastic foil down to the end of the outer jacket.
6. Bend the shield or sheath wire outward by about 90°.
7. Slide the plastic insert with seal all the way to the end of the outer sheath.
8. Fold the shield or sheath wire over the plastic insert with seal. The shield or sheath wire is only permitted to extend to the first edge of the plastic insert.
9. By twisting it back and forth, work the plastic insert together with the seal into the intermediate fitting until the twist protection (stub insert) snaps into place.
10. Screw the union nut onto the intermediate stub and tighten securely using a wrench (size 17 mm (0.67 in), 3.5 Nm (2.58 ft lb)).

6.7.2 Terminal configuration

Carry out connection to the power supply and the complete system according to the following terminal configuration.

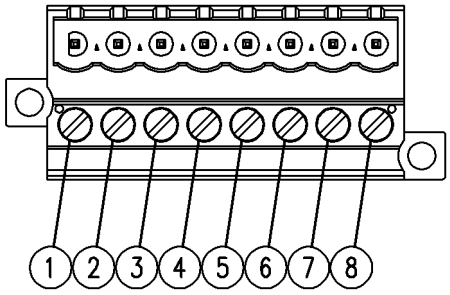


Fig. 23: Connecting terminal configuration

1 "+UL" Alarm line voltage input
2 "+UL" Alarm line voltage output
3 "-UL" GND input
4 "-UL" GND output
5 "+UF" Fault line voltage input
6 "+UF" Fault line voltage output
7 "Ext" External display, open collector
8 "T/R" Test/reset input

Connect the detector to the voltage supply and complete system in accordance with the connecting terminal configuration.

6.8 Connect the complete system (control drawings)

Electrical connection of the detectors to associated apparatus (safety barriers) is shown as an intrinsically safe system in the drawings below (control drawings).

An intrinsically safe system can consist of the interconnection of intrinsically safe devices and associated apparatus (safety barriers) investigated under the entity evaluation concept.

Hazardous (classified) location:[1)]

Class I, Zone 1, Group IIC

Class I, Zone 2, Group IIC

Zone 20, Group IIIC

Zone 21, Group IIIC

Zone 22, Group IIIC

Class I, Division 1, Groups A,B,C,D

Class II, Division 1, Groups E,F,G

Class III, Division 1

Class I,II,III, Division 2, Groups A,B,C,D,F,G

Intrinsically safe entity parameters:

U_i = 28 V DC

I_i = 100 mA

C_i = 360 pF

L_i = 960 nH

P_i = 1,2 W

Only use FM-approved associated apparatus (safety barriers) with U_o, I_o, C_o, L_o, P_o (see installation note 1.) [1)]

Installation notes:

1. $U_i \geq U_o$; $I_i \geq I_o$; (C_i of all detectors + C_{cable}) ≤ C_o; (L_i of all detectors + L_{cable}) ≤ L_o; $P_i \geq P_o$

2. Refer to the data sheet for information on the cable capacitance and inductance. Otherwise, use the following values:

Cable capacitance C_{cable}/m = 200 pF/m

Cable capacitance L_{cable}/m = 1 µH/m

3. Associated apparatus must be FM approved in line with the entity concept.[1)]

4. Associated apparatus (safety barriers) or devices can be installed within the hazardous (classified) location for which they are approved.

5. Control units connected to associated apparatus must not use or generate more than 250 V.

6. Installation must take place in accordance with ANSI/ISA RP12.06.01 “Installation of Intrinsically Safe Systems for hazardous (classified) locations” and the National Electrical Code® (ANSI/NFPA 70). The correct cable glands with an M16x1.5 thread must be used.[1)]
7. Revisions of this chapter require FM approval.[1)]
8. AEx ‘[ib]’ is suitable only for Class I, Zone 1 hazardous (classified) locations and not for Class I, Zone 0 oder Class I, Division 1 hazardous (classified) locations.[1)]

[1)] according to NEC 500/505

6.8.1 Alarm line wiring diagram

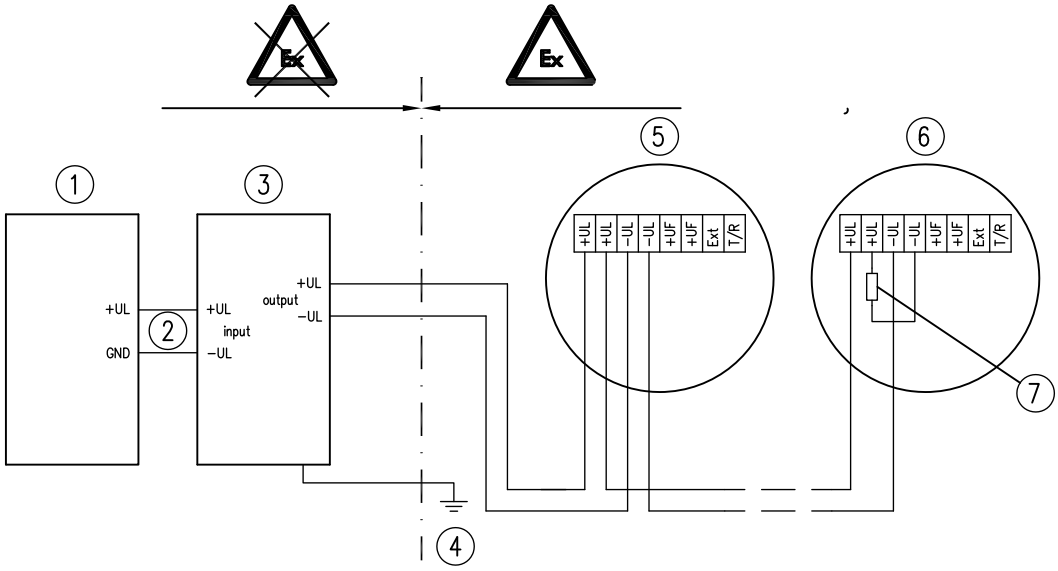


Fig. 24: Alarm line wiring without a fault line with a zener barrier

1 Fire alarm control panel
2 Alarm line
3 Safety barrier
4 Equipotential bonding explosion hazard area
5 Detector 1
6 Detector n
7 End-of-line resistor (EOL)

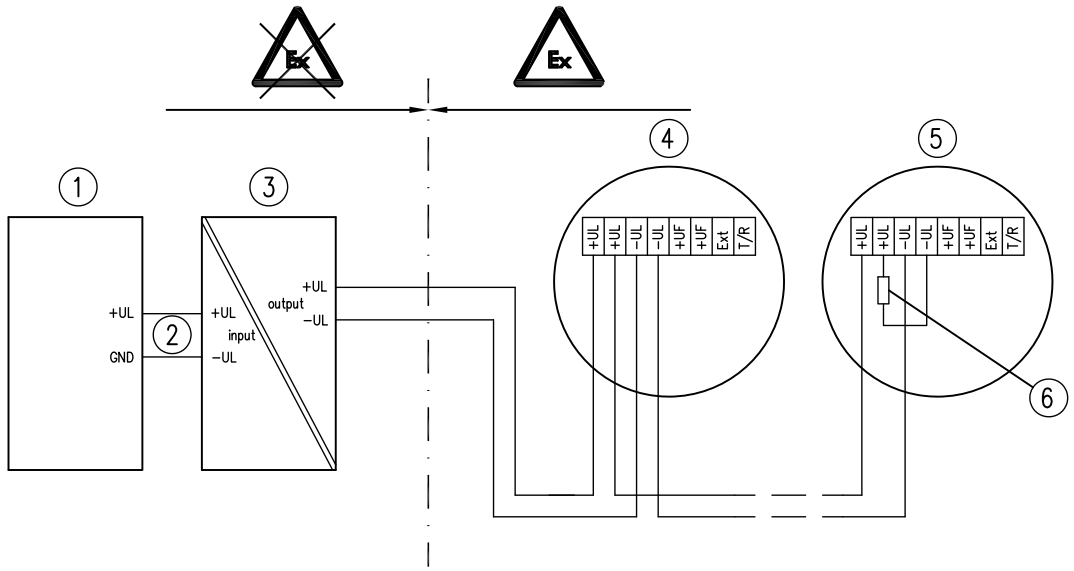


Fig. 25: Alarm line wiring without a fault line with a galvanically isolated barrier

1 Fire alarm control panel
2 Alarm line
3 Safety barrier
4 Detector 1
5 Detector n
6 End-of-line resistor (EOL)

6.8.2 Alarm and fault line wiring diagram

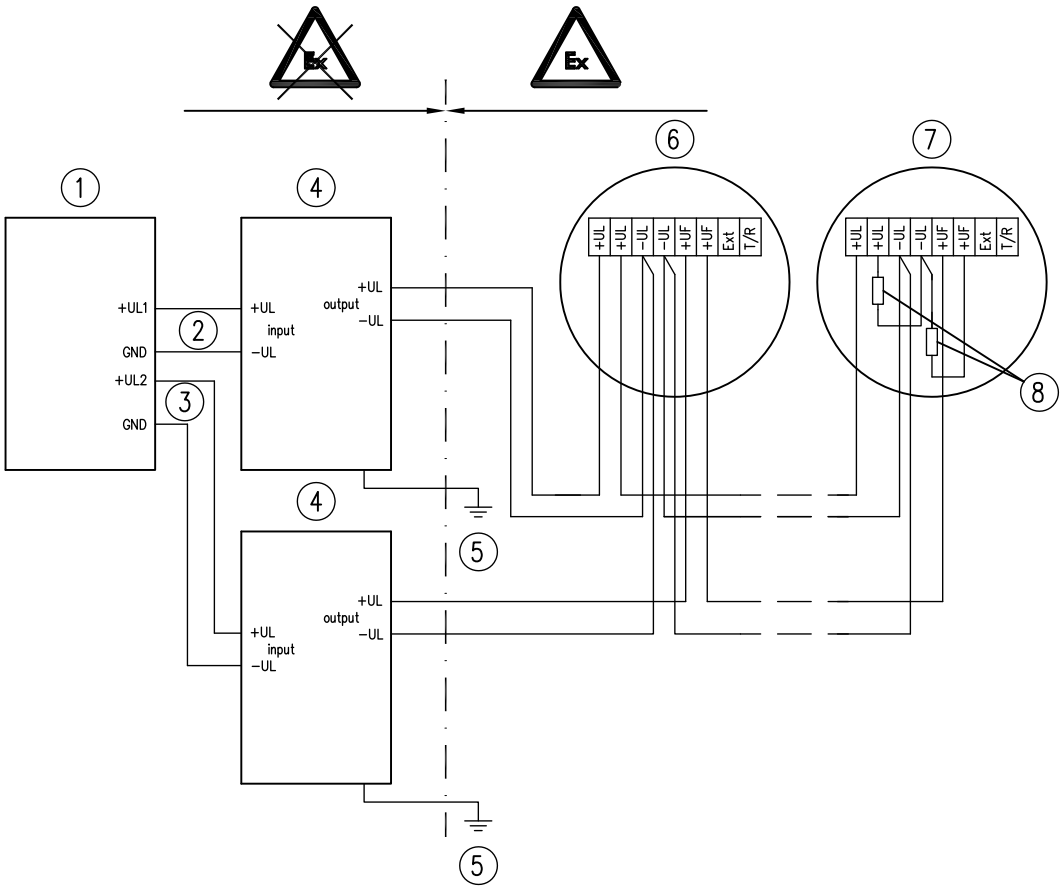


Fig. 26: Alarm line wiring with a fault line and a zener barrier

1 Fire alarm control panel
2 Alarm line
3 Fault line
4 Safety barrier
5 Equipotential bonding explosion hazard area
6 Detector 1
7 Detector n
8 End-of-line resistor (EOL)

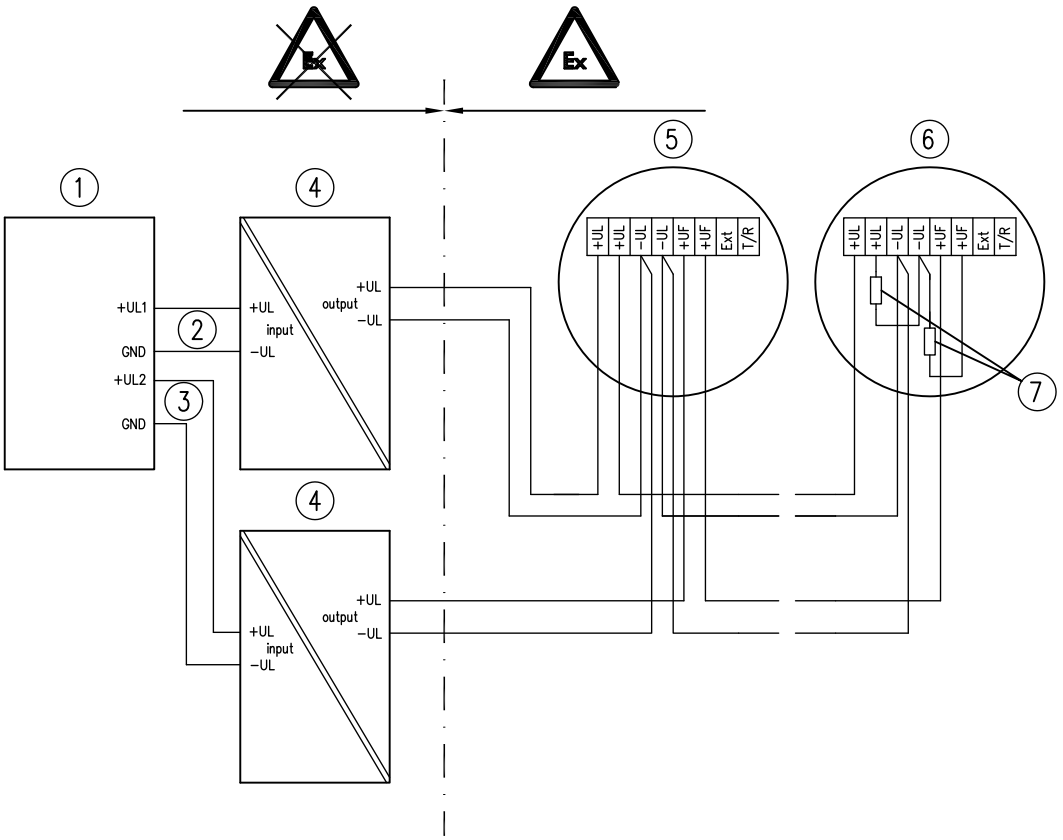


Fig. 27: Alarm line wiring with a fault line and a galvanically isolated barrier

1 Fire alarm control panel
2 Alarm line
3 Fault line
4 Safety barrier
5 Detector 1
6 Detector n
7 End-of-line resistor (EOL)

INFORMATION

If a fault line is used, the complete cabling must have a separately laid "-UL" wire for each detector line!

6.8.3 Alarm line wiring diagram, external indicator and test/reset button

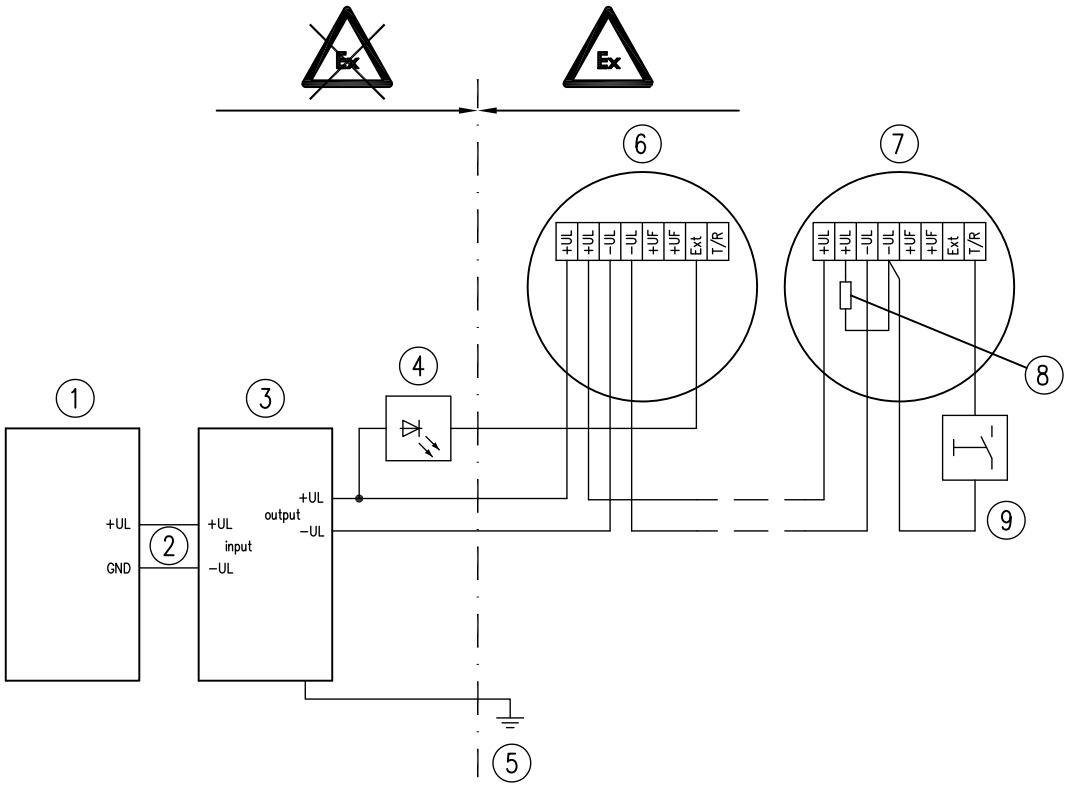


Fig. 28: Alarm line wiring, external indicator and test/reset button with a zener barrier

1 Fire alarm control panel
2 Alarm line
3 Safety barrier
4 External indicator
5 Equipotential bonding explosion hazard area
6 Detector 1
7 Detector n
8 End-of-line resistor
9 Test/reset button for test triggering

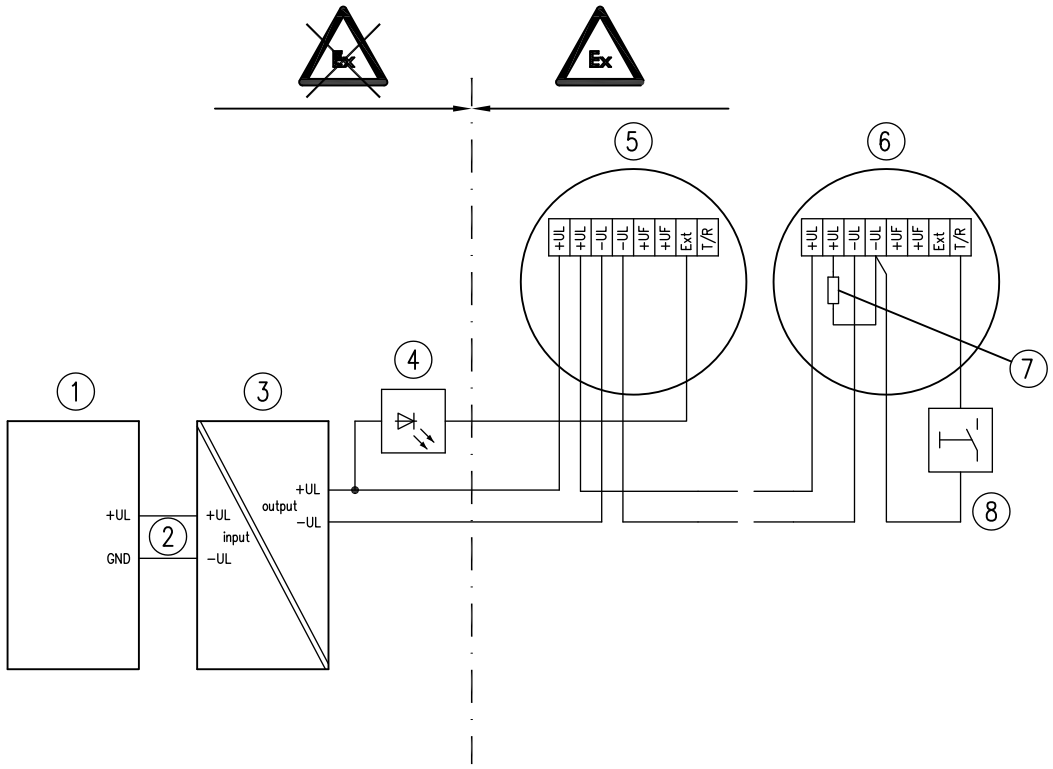


Fig. 29: Alarm line wiring, external indicator and test/reset button with a galvanically isolated barrier

1 Fire alarm control panel
2 Alarm line
3 Fault line
4 External indicator
5 Detector 1
6 Detector n
7 End-of-line resistor
8 Test/reset button for test triggering

Connection instructions

The line connected to the "T/R" connecting terminal for the test/reset button (Fig. 28/9) must not exceed 1500 mm in length or a total impedance of 100 Ω.

6.8.4 Wiring diagram of individually addressable detectors with KMX5000 AP Ex

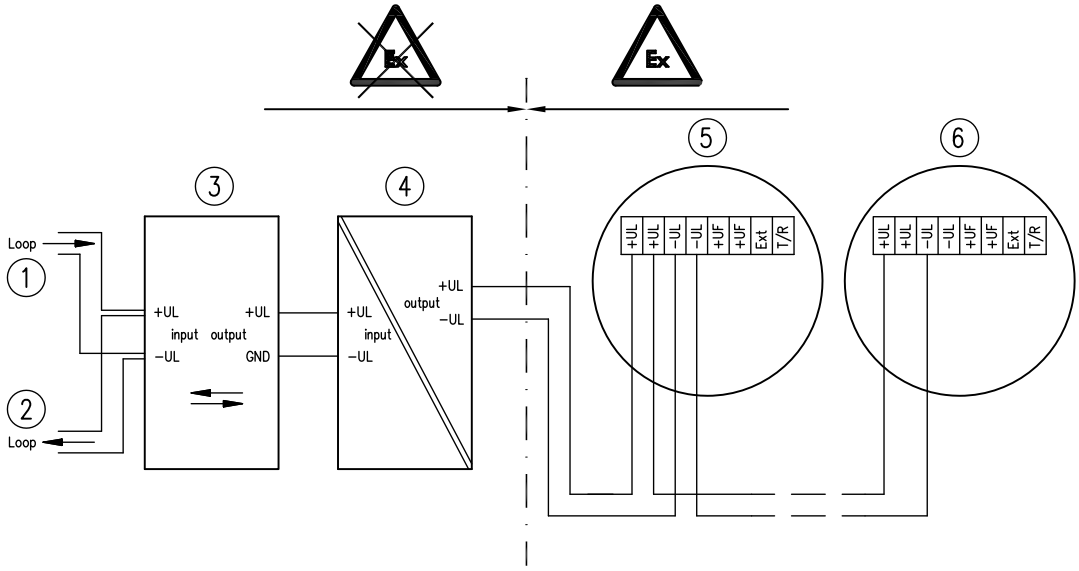


Fig. 30: Wiring diagram – individually addressable operation in the spur at the loop

1 Loop end
2 Loop start
3 Protocol translator
4 Safety barrier
5 Detector 1
6 Detector n

INFORMATION

Observe the maximum conductor cross-sections ↬ Chapter 12.3 “Electrical data” on page 76

INFORMATION

When connecting Fig. 30, note that removing a detector will cause wire break. In order to prevent this, the incoming and outgoing wires of the loop line can alternatively be jointly run through one connecting terminal [with the same rigid cross-section up to 1 mm² (AWG 18), flexible up to 1.5 mm²(AWG 16)].

6.9 UniVario® KMX5000 AP Ex communication module

6.9.1 Installation of communication module

The detector address has been assigned to the communication module (Fig. 31/2) via DIP switches ↬ *Chapter 6.9.3 “Address communication module” on page 56*.

Mount the communication module as illustrated until it clicks into position.

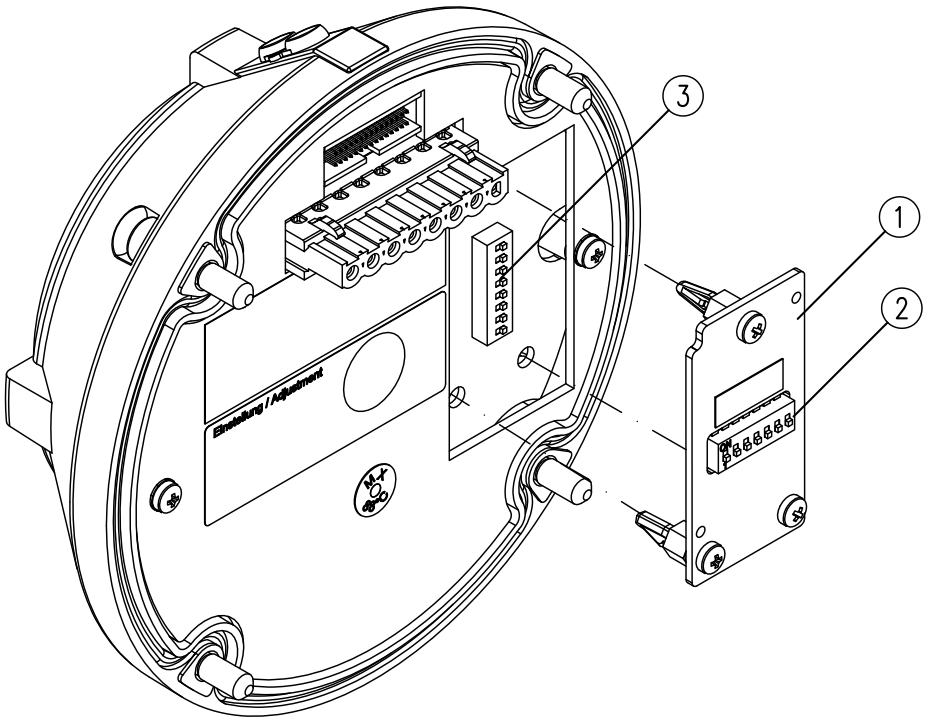
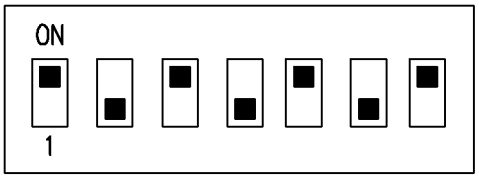


Fig. 31: Mount the KMX5000 AP Ex communication module on the detector

1 KMX5000 AP Ex communication module
2 DIP switch on the KMX5000 AP Ex communication module
3 DIP switch on the detector

6.9.2 Example addressing



Address 42	Switches 1-3-5-7

Fig. 32: DIP switches on KMX5000 AP – example address 42

6.9.3 Address communication module

Address	DIP switch	Address	DIP switch	Address	DIP switch
1	-234567	43	--3-5-7	85	-2-4-6-
2	1-34567	44	12--5-7	86	1--4-6-
3	--34567	45	-2--5-7	87	---4-6-
4	12-4567	46	1---5-7	88	123--6-
5	-2-4567	47	----5-7	89	-23--6-

Address	DIP switch	Address	DIP switch	Address	DIP switch
6	1--4567	48	1234--7	90	1-3--6-
7	---4567	49	-234--7	91	--3--6-
8	123-567	50	1-34--7	92	12---6-
9	-23-567	51	--34--7	93	-2---6-
10	1-3-567	52	12-4--7	94	1----6-
11	--3-567	53	-2-4--7	95	-----6-
12	12--567	54	1--4--7	96	12345--
13	-2--567	55	---4--7	97	-2345--
14	1---567	56	123---7	98	1-345--
15	----567	57	-23---7	99	--345--
16	1234-67	58	1-3---7	100	12-45--
17	-234-67	59	--3---7	101	-2-45--
18	1-34-67	60	12----7	102	1--45--
19	--34-67	61	-2----7	103	---45--
20	12-4-67	62	1-----7	104	123-5--
21	-2-4-67	63	------7	105	-23-5--
22	1--4-67	64	123456-	106	1-3-5--
23	---4-67	65	-23456-	107	--3-5--
24	123--67	66	1-3456-	108	12--5--
25	-23--67	67	--3456-	109	-2--5--
26	1-3--67	68	12-456-	110	1---5--
27	--3--67	69	-2-456-	111	----5--
28	12---67	70	1--456-	112	1234---
29	-2---67	71	---456-	113	-234---
30	1----67	72	123-56-	114	1-34---
31	-----67	73	-23-56-	115	--34---
32	12345-7	74	1-3-56-	116	12-4---
33	-2345-7	75	--3-56-	117	-2-4---
34	1-345-7	76	12--56-	118	1--4---
35	--345-7	77	-2--56-	119	---4---
36	12-45-7	78	1---56-	120	123----
37	-2-45-7	79	----56-	121	-23----
38	1--45-7	80	1234-6-	122	1-3----
39	---45-7	81	-234-6-	123	--3----

Address	DIP switch	Address	DIP switch	Address	DIP switch
40	123-5-7	82	1-34-6-	124	12-----
41	-23-5-7	83	--34-6-	125	-2-----
42	1-3-5-7	84	12-4-6-	126	1------

7 Commissioning

Have the work described in this section carried out only by the following persons:

Personnel: ■ Qualified specialist personnel

7.1 Preparation for start-up

⚠ WARNING

Risk of injury due to accidental triggering!
Incorrect installation of the device may cause unwanted triggering. This can cause serious injury and substantial damage to the system.

- Ensure that the equipment has been installed correctly before starting any work on the fire detection system.

The following must be ensured before start-up:

- The detector has been configured in accordance with the configuration requirements
- The detector has been correctly installed
- The detector is not damaged
- Connection has been carried out correctly
- Cable entries have been sealed
- All screws have been securely tightened
- End-of-line resistor (EOL) has been installed in the last detector (if necessary)

7.2 Carrying out start-up

Operation without fire detection control panel

1. Switch on the voltage supply.
   ⇨ After a maximum of one minute, the green operation indicator flashes at 10-second intervals. If the green normal operation indicator does not start to flash or if the fault indicator lights up.
2. Carry out a function check *Chapter 8.4 “Function check” on page 64*.

Operation with a fire detection control panel

1. Put the detector line into operation in accordance with the operating instructions of the fire detection control panel.
2. Switch on the voltage supply.
   ⇨ After a maximum of one minute, the green operation indicator flashes at 10-second intervals. If the green normal operation indicator does not start to flash or if the fault indicator lights up.
3. Carry out a function check *Chapter 8.4 “Function check” on page 64*.

INFORMATION

The fault indicator lights up only when there is no alarm and the fault line is connected.

INFORMATION

The yellow fault indicator does not light up during loop mode.

8 Maintenance

Have the work described in this section carried out only by the following persons:

Personnel: ■ Qualified specialist personnel

Maintenance work must be carried out in accordance with national guidelines and standards and at regular intervals, taking account of operating conditions and environmental factors.

8.1 Test intervals

The intervals given are minimum values. If required due to ambient conditions, maintenance must be carried out more frequently:

- At high ambient temperatures.
- If used in areas with aggressive media.
- If contamination can be anticipated due to operating conditions.

Interval	Activity	Component	Chapter
At least quarterly	Inspection	All detectors	*Chapter 8.2 “Inspection” on page 61*
At least quarterly	Test triggering (random sample)	At least one detector per detector line	*Chapter 8.3 “Test triggering” on page 62*
Quarterly	Function check (random sample)	At least one detector per detector line	*Chapter 8.4 “Function check” on page 64*
Annually	Cleaning	Optical system	*Chapter 8.5 “Cleaning” on page 66*
Annually	Test triggering	All detectors	*Chapter 8.3 “Test triggering” on page 62*
Annually	Function check	All detectors	*Chapter 8.4 “Function check” on page 64*

8.2 Inspection

Carry out the following inspections:

- Check the detector housing, especially the cable entries, for seal tightness.
- Check the detector housing, especially the optical system, for mechanically flawless and clean condition.

- Check to ensure that the detector and detector base are properly anchored.
- Check the area to be monitored for a change in the use of the room and any sources of interference.
- Check the ambient temperature in the area to be monitored for adherence to the permissible operating temperature (↬ *Chapter 3.10 “Temperature measuring pad” on page 20*)
- Check the operation indicator.

8.3 Test triggering

Test triggering ensures that the software and the transmission paths (alarm line and, if present, fault line) to the evaluation unit are functioning properly.

INFORMATION

Test triggering does not replace the function check! Only an IR source test verifies full functionality of the sensor system ↬ Chapter 8.4 “Function check” on page 64.

Prerequisites

- Detector has been in operation longer than 30 s.
- If test triggering via the reed switch: DIP switch 1 in OFF position ↬ *Chapter 5 “Configuration” on page 31*.
- When a fire alarm control panel is connected: The relevant lines/groups of the fire alarm control panel are in revision mode.
- There is no alarm message or fault signal present.

NOTICE

Property damage caused by unauthorized release of a transmission unit or a fire extinguishing system is possible!
Prior to the function test, ensure that the relevant lines/groups of the fire detection control panel are in revision mode and any connected transmission unit or fire extinguishing system is deactivated and secured.

When actuating the reed switch or test/reset button the first time, test triggering begins, actuating a second time ends test triggering. Actuation must last at least 2 s.

Example of test triggering via reed switch

1. Check if the prerequisites have been met ↬ *Chapter 8.2 “Inspection” on page 61*.
2. Move the permanent magnet to the position of the reed switch (Fig. 6) on the detector and hold there.
   ⇨ If a fault line is connected, the fault indicator lights up.

3. Remove the magnet from the detector housing.
   ⇨ If a fault line is connected, the fault indicator turns off.

   The alarm indicator lights up.

   If an optional external indicator is connected, the external indicator lights up.
4. In the case of two-detector dependency, repeat steps 1 to 3 on the second detector.
5. When connecting a fire alarm control panel, the message inputs must be checked on that panel.
6. Move the magnet to the position of the reed switch (Fig. 6) on the detector and hold there.
   ⇨ The alarm indicator turns off.

   If a fault line is connected, the fault indicator lights up.

   If an optional external indicator is connected, the external indicator turns off.
7. Remove the magnet from the detector housing.
   ⇨ If a fault line is connected, the fault indicator turns off.
8. In the case of two-detector dependency, repeat steps 6 to 7 on the detector used in step 4.

8.3.1 Execution

NOTICE

Property damage caused by unauthorized release of a transmission unit or a fire extinguishing system is possible!
Prior to the function test, ensure that the relevant lines/groups of the fire detection control panel are in revision mode and any connected transmission unit or fire extinguishing system is deactivated and secured.

When actuating the reed switch or test/reset button the first time, test triggering begins, actuating a second time ends test triggering. Actuation must last at least 2 s.

Example of test triggering via reed switch

1. Check if the prerequisites have been met *Chapter 8.2 “Inspection” on page 61*.
2. Move the permanent magnet to the position of the reed switch (Fig. 6) on the detector and hold there.
   ⇨ If a fault line is connected, the fault indicator lights up.
3. Remove the magnet from the detector housing.
   ⇨ If a fault line is connected, the fault indicator turns off.

   The alarm indicator lights up.

   If an optional external indicator is connected, the external indicator lights up.

4. In the case of two-detector dependency, repeat steps 1 to 3 on the second detector.
5. When connecting a fire alarm control panel, the message inputs must be checked on that panel.
6. Move the magnet to the position of the reed switch (Fig. 6) on the detector and hold there.
   ⇨ The alarm indicator turns off.

   If a fault line is connected, the fault indicator lights up.

   If an optional external indicator is connected, the external indicator turns off.
7. Remove the magnet from the detector housing.
   ⇨ If a fault line is connected, the fault indicator turns off.
8. In the case of two-detector dependency, repeat steps 6 to 7 on the detector used in step 4.

8.4 Function check

NOTICE

Property damage caused by unauthorized release of a transmission unit or a fire extinguishing system is possible!
Prior to the function test, ensure that the relevant lines/groups of the fire detection control panel are in revision mode and any connected transmission unit or fire extinguishing system is deactivated and secured.

8.4.1 Prerequisites

- Before carrying out this function check, the detector must have been in operation for longer than 30 s.
- In the case of two-detector dependency a detector, as described in *Chapter 8.3.1 “Execution” on page 63* steps 1 to 3, can be switched to the "test alarm" state so that the function check to be carried out here, if successful, represents the second alarm. Alternatively, the check must also be done on a second detector at the same time (for fire detection control panels within the analysis time).

Resetting an alarm is only possible after approx. 5 s without IR radiation.

If no triggering can be caused using the function checks described below, the electrical connection must be inspected as described in *Chapter 6.6 “Electrical connection” on page 43* and the procedure described in *Chapter 8.5 “Cleaning” on page 66* followed.

If the device is not triggered after doing the function test again, the device should be replaced immediately and checked by Customer Service.

8.4.2 Function test with test light

WARNING

Risk of explosion caused by open flames, hot surfaces or optical radiation
Never use open flames or other ignition sources in explosion hazard areas.
Only used permissible operating equipment for the function check or ensure there is no explosion hazard present.

WARNING

Danger of eye damage!
Never look into the beam of light or point at another person when using a test light.

The check can be carried out with a test light as follows:

1. Switch the test light on and point the light beam at the flame detector from about 10 cm (3.94 in) away.
2. The detector alarm must trip within 10 s (alarm indicator). (The time depends on the fire sensitivity setting of the detector.)
3. Where appropriate, give consideration to two-detector dependency as described above.
4. Check that the message has reached the fire detection control panel.
5. After successfully carrying out the function check, all the alarms of the detectors used must be reset, also at the fire detection control panel if necessary.

8.4.3 Contamination monitoring function test

INFORMATION

The maximum self-monitoring system response time to soiled optics is 10 minutes.

This function test must be performed as necessary and is not part of the regular function tests to be performed. Contamination monitoring can be tested as follows while the optics test is aktivited (↯ *Chapter 5.2 “Carry out configuration” on page 32*):

1. Use a suitable object to cover the side of the reflector that faces the optics.
   ⇨ The view between the reflector and optics is interrupted. Based on the usage, a fault signal is issued as per ↯ *Chapter 3.7 “Fault signaling” on page 19*.
2. Following a successful function test, remove the optical interruption between the reflector and optics.
   ⇨ The fault signal is reset automatically.

8.5 Cleaning

NOTICE

Functional impairment of the detector from cleaning agents
Using other cleaning agents may impair the functionality of the detector. Cleaning of the optical system may only be carried out according to the instructions given above.

INFORMATION

The optical system cleaning set can be used to clean the optical system Chapter 10.7 “Special accessories” on page 72. The use of the cleaning set is described in the corresponding product information.

Procedure

1. Soak a cotton cloth (if possible pure natural fiber without other material) in some isopropyl alcohol. Carefully clean the optical system with the cloth from the outside, as well as the reflector from both sides, until dirt is no longer visible.
2. Use a clean portion of the cloth dipped in some isopropyl alcohol to wipe it clean again.
3. Polish clean with a dry, clean portion of the cotton cloth.
4. Complete a function check.

If, after cleaning the optical system, the flame detector no longer allows triggering as described in *Chapter 8.4 “Function check” on page 64* , the device must be replaced immediately and checked by Customer Service.

8.6 Detector replacement

Depending on the ambient conditions, detectors must be replaced **after 10 years at the latest**. Depending on the demand at the installation location, components may age prematurely and need to be replaced sooner. The following table provides a guideline for detector replacement intervals in accordance with the demand at a particular installation location:

Demand	Ambient conditions	Detector replacement
High	Constant temperature at installation location between 60 °C (140 °F) and 80 °C (176 °F) or frequent and high temperature fluctuations (more than 50 times annually with temperature variances of more than 50 K)	Recommended after 4 years of operation
Medium	Constant temperature at installation location between 0 °C (32 °F) and 60 °C (140 °F) or frequent and medium temperature fluctuations (more than 50 times annually with temperature variances of between 20 K and 50 K)	Recommended after 7 years of operation
Normal	Constant temperature at installation location between 10 °C (50 °F) and 30 °C (86 °F) and less frequent and infrequent temperature fluctuations (less than 50 times annually with temperature variances under 20 K)	Required after 10 years of operation

9 Troubleshooting

Have the work described in this section carried out only by the following persons:

Personnel: ■ Qualified specialist personnel

The following symptoms indicate a fault:

- The fault indicator lights up with connected fault line when there is no alarm.
- The operation indicator does not flash.

Check the possible causes of the fault in the following order:

Possible causes	Remedy
The optical system is dirty or damaged.	1. If damaged: Replace the detector. 2.Clean if necessary, *Chapter 8.5 “Cleaning” on page 66*. 3. If the fault indicator does not go out 2 minutes after cleaning, have the detector checked or replaced by Customer Service *Chapter 8.4 “Function check” on page 64*.
The detector was operated outside the permissible operating temperature range.	1. Remove the detector from the detector base. 2.Check the dot on the temperature measuring pad for dark color. If the color of the dot on the temperature measuring pad is dark, the detector was used above the maximum permissible operating temperature *Chapter 12.4 “Climatic data” on page 77*. In this case: 3. Replace the detector.

Possible causes	Remedy
The detector was operated outside the operating voltage range.	1. For line operation: If present, measure the operating voltage of the next detector (away from the fire detection system). 2. If there is no adjacent detector present: Remove the detector from the detector base. 3. Measure the voltage at the "+UL" and "-UL" connecting terminals. The voltage must be within the operating voltage range ↳ *Chapter 12.3 “Electrical data” on page 76*. 4. If voltage is sufficient: Put the detector back into operation ↳ *Chapter 7 “Commissioning” on page 59*. If after putting it back into operation again, a fault message already occurs after approx. 30 s or the operating indicator does not flash within one minute, see the following step.
● DIP switch malfunction ● Error in the memory contents ● Internal AD converter defective ● General fault	Have the detector checked or replaced by Customer Service.

No test alarm is triggered during a function check or test triggering:

Possible causes	Remedy
Electrical connection not correct	Check the electrical connection ↳ *Chapter 6.6 “Electrical connection” on page 43*.
Optical system dirty	Clean the optical system ↳ *Chapter 8.5 “Cleaning” on page 66* and carry out the function check again. If triggering does not occur after that: Have the detector checked or replaced by Customer Service.

10 Accessories and spare parts

10.1 Detector base

Designation	Art.-Nr.
UniVario® MX5000 Ex base[a)]	912082
UniVario® MX5000 Ex ST base[b)]	916173
MX5000 dust cap	921694
UniVario® MX5000 M20 Ex base[a)]	922432
UniVario® MX5000 M20 NG Ex base[a)]	924179
UniVario® MX5000 NPT base[a)]	922431

[a)] not for FMX5000 IR Ex ST

[b)] not for FMX5000 IR Ex

10.2 Detector attachment

Designation	Part No.
UniVario® MX5000 bracket	904757
MX5000 F console	904758
M5 housing screw for UniVario® detector	904282
Bracket screw for UniVario® MX5000 bracket	904355
MX5000 ST mounting bracket	914914
M5 housing screw for UniVario® stainless steel detector	917705
Fixing screw of mounting bracket for UniVario® stainless steel detector	917707

10.3 Communication interfaces

Designation	Part No.
UniVario® KMX5000 AP Ex communication module	912086
LMX5000 repeater panel	908499
SBEx-9 safety barrier	933093
Ex Loop AP 24 V safety barrier (with FM approval)	901324
Protocol Translator Loop AP	901322

10.4 Service accessories

Designation	Part No.
UniVario® SMX5000 service device	906136

10.5 Recommended connection cables

Designation	Part No.
HELU JE-Y(St)Y connection cable 2 x 2 x 0.8, blue	902674
J-Y(St)Y connection cable 2 x 2 x 0.8, red	747180
EB JE-LiYCY BD connection cable BD 5 x 0.5 mm², gray	606061
Ölflex connection cable EB CY 3 x 0.75 mm²	919318
OB-BL-PAAR-CY connection cable 2 x 2 x 0.5 mm^2, blue, Ex	920326

10.6 Installation material

Designation	Part No.
Explosion-proof cable gland M16 x 1.5 (cable diameter 6 mm to 8 mm) (0.24 in ... 0.31 in)	904652
Explosion-proof cable gland M16 x 1.5 (as #904652, but cable diameter 8 mm to 10 mm) (0.31 in ... 0.39 in)	4003993
Explosion-proof cable gland M20 x 1,5 Vent (with pressure relief function) (cable diameter 5 mm to 11 mm) (0.28 in ... 0.43 in)	933514
Explosion-proof cable gland M20 x 1,5 Vent EMV (with pressure relief function) (cable diameter 5 mm to 11 mm) (0.28 in ... 0.43 in)	933515
Explosion-proof cable gland M20 x 1.5 Ex-d A4 [a)] (cable diameter 7 mm to 12 mm) (0.28 in ... 0.43 in)	920793
Seal for UniVario® detector (on detector side)	904762
EMC seal for UniVario® detector (on detector base side)	904752
For UniVario® KMX5000 AP Ex (option): Flat-head screw ISO7045-M3x4-PA-H	905033
For UniVario® KMX5000 AP Ex (option): Spacer M3x6 PA6.6	905032

[a)] For MX5000 ST base, only this screw connection is to be used.

10.7 Special accessories

Designation	Part No.
Cold-shrinkable tube, silicone 25 > 5.6 mm	905337
Complete weatherproof housing MX5000	910134
Optical system cleaning set	916644

11 Disassembly and disposal

After end of use, the detector must be disposed of or brought to a recycling center in accordance with statutory regulations.

Upon request the manufacturer can take back and properly dispose of the electrical equipment and electronic devices for you within the European Union according to Directive 2012/19/EU.

Procedure

1. Loosen screws (Fig. 17/4) and remove detector (Fig. 17/3) from the detector base (Fig. 17/2).
2. Disconnect the cable connections from the terminal block.
3. Disconnect the connection cable from the cable gland on the detector base.
4. Remove the detector base.

12 Technical data

12.1 Functional data

Measuring principle	Detection of IR radiation
Response threshold values	In accordance with EN54 – Part 10: Classes 1, 2 or 3 Outside EN54: Class X (50 m)
Detection criterion	Change in IR intensity
Response time	1 s ... 30 s (depending on intensity)
Ready to operate	30 s after switching on
Duration of voltage interruption for alarm reset, line cycle time	30 ms
Duration of voltage interruption for reset, detector restart	4 s
Operation indicator	LED green Without fault: flashing every 10 s With fault: no flashing
Alarm indicator	LED red
Fault indicator	LED yellow (with connected fault line only)
Wall or corner assembly (VdS)	Rectangular room volume with an edge length of Class 1: max. 26 m (85 ft) Class 2: max. 20 m (65 ft) Class 3: max. 13 m (43 ft)
Area to be monitored (VdS)	Class 1: max. 676 m² (808 sq yd) Class 2: max. 400 m² (478 sq yd) Class 3: max. 169 m² (202 sq yd)
Room height (VdS):	Class 1: max. 45 m (148 ft) Class 2: max. 33 m (108 ft) Class 3: max. 23 m (75 ft) Depending on respective surface area to be monitored
Viewing angle	90°

12.2 Mechanical data

FMX5000 IR Ex

Housing	Die-cast aluminum
Color	Red (similar to RAL 3000)
Weight (including base and bracket)	approx. 1030 g (36 oz)
Dimensions (including base)	92 mm x 130 mm x 140 mm (L x W x H) (3.62 in x 5.12 in x 5.51 in)
Cable entry	depending on the detector base ↳ *Chapter 3.12 “Detector base” on page 22*
Connection cable diameter	depending on the detector base ↳ *Chapter 3.12 “Detector base” on page 22*
Conductor cross-section of connection cable	
One conductor, stiff or flexible	0,5 mm² ... 2,5 mm² (21 AWG ... 14 AWG)
Two conductors with same cross-section, stiff	0,5 mm² ... 1 mm² (21 AWG ... 18 AWG)
Two conductors with same cross-section, flexible	0,5 mm² ... 1,5 mm² (21 AWG ... 16 AWG)
Protection type	IP 66 and IP 67 (EN 60529)

FMX5000 IR Ex ST

Housing	Stainless steel
Weight (including base and bracket)	approx. 1800 g (63 oz)
Dimensions (including base)	92 mm x 130 mm x 140 mm (L x W x H) (3.62 in x 5.12 in x 5.51 in)
Cable entry [a)]	M20 x 1.5 metal screw connection (2 pcs)
Connection cable diameter [a)]	7 mm ... 12 mm
Conductor cross-section of connection cable	
One conductor, stiff or flexible	0.5 mm² ... 2.5 mm² (21 AWG ... 14 AWG)
Two conductors with same cross-section, stiff	0.5 mm² ... 1 mm² (21 AWG ... 18 AWG)

Two conductors with same cross-section, flexible	0.5 mm² ... 1.5 mm² (21 AWG ... 16 AWG)
Protection type	IP 66 and IP 67 (EN 60529)

KMX5000 AP Ex communication module (option)

Weight	approx. 15 g (0.529 oz)
Dimensions	54 mm × 28 mm × 19.5 mm (L x W x H) (2.13 in x 1.10 in x 0.77 in)

12.3 Electrical data

Detector

Nominal voltage	9 V ... 24 V DC
Operating voltage	7.6 V ... 28 V DC
Start-up current	max. 4.5 mA
Nominal current consumption (quiescent current) Detector Detector with KMX5000 AP Ex (option)	approx. 30 s after start-up 4.5 mA 4.5 mA
Ripple current Detector Detector with KMX5000 AP Ex (option) Alarm current consumption (without quiescent current)	 200 µA approx. millisecond range 200 µA approx. millisecond range approx. 15 mA
Fault line current consumption (without fault indicator)	approx. 250 µA
Fault indicator current consumption (without quiescent current)	approx. 15 mA, with connected fault line only
External indicator	I_{max} = 1 mA, above operating voltage +UL
Test/reset input	Switch of "T/R" against "-UL" at a distance of 1.5 m max., 100 Ω max.
Explosion protection parameters (FMX5000 IR Ex)	Ui: 28 V Ii: 100 mA Pi: 1.2 W Ci: 360 pF Li: 960 nH

KMX5000 AP Ex communication module (option)

Loop-side operation type	Apollo protocol XP95
Operating voltage	14 ... 22 V DC plus 5 ... 9 V (peak-to-peak) protocol hub, voltage supply from detector
Operating currents	230 µA rms, 300 µA peak

12.4 Climatic data

Detector

Ambient temperature Ta	T4: -40 °C ≤ Ta ≤ +80 °C T6: -40 °C ≤ Ta ≤ +40 °C T_{200}95 °C: -40 °C ≤ Ta ≤ +70 °C T_{200}105 °C: -40 °C ≤ Ta ≤ +80 °C
Storage temperature	-40 °C ... +85 °C (-40 °F ... +185 °F)
Relative humidity	95 % at 35 °C (95 °F), non-condensing
Atmospheric pressure	66 kPa ... 106.7 kPa
max. altitude for use above sea level	approx. 3500 m (11,500 ft)

KMX5000 AP Ex communication module (option)

Ambient temperature	–40 °C ... +80 °C (-40 °F ... +176 °F)

12.5 Approvals / conformity

Detector

VdS approval	G209141 (EN54-10)
CE Directives	2014/30/EU (EMC) 2014/34/EU (ATEX) 2011/65/EU (RoHS)
Certificate of conformity	0786-CPR-20784
Conformity in accordance with 2014/34/EU	FMX5000 IR Ex: ⟨Ex⟩ II 2G; ⟨Ex⟩ II 1D FMX5000 IR Ex ST: ⟨Ex⟩ II 1G; ⟨Ex⟩ II 1D
EU type examination certificate	BVS 12 ATEX E 088

IECEx certificate of conformity	IECEx BVS 12.0056
FM approval	FM3600: 2022; FM3610:2021; FM3810:2021; ANSI/UL 60079-0:2020; ANSI/UL 60079-11:2018

KMX5000 AP Ex communication module (option)

VdS approval	G207032 (EN54-18)
Certificate of conformity	0786-CPR-20315

13 Packaging, Storage and Transport

13.1 Transport and Packaging

The product described here is packed according to the quantity, transportation mode and transportation conditions.

- Transport the product in such a way that it does not create a source of danger by falling.
- Protect the product against external force such as impact, shock and vibrations.
- Inspect the product for completeness and visible signs of damage immediately on receipt.
- Store the product in the original packaging until it is installed.
- Dispose of the packaging material in accordance with the prevailing legal provisions and local regulations.

13.2 Storage

The product described here has to be stored always in a dry place, free of dirt and under the conditions as specified in the chapter “Technical data”. The product has to be stored in the original packaging. If this is not possible use a similar packaging to protect the product described here against damage and pollution.

Appendix

A Declaration of conformity FMX5000 IR Ex

MINIMAX

EU-Konformitätserklärung
EU Declaration of Conformity

Gegenstand / Typ:
Subject / Type:
Flammenmelder UniVario FMX5000 IR Ex, FMX5000 IR Ex ST
Modul KMX5000 AP Ex
Flame Detector UniVario FMX5000 IR Ex, FMX5000 IR Ex ST
Module KMX5000 AP Ex

Zum Einsatz in Brandmeldesystemen und Löschsteueranlagen
For use in fire detection and exinguishing control systems

Die vorgenannten Geräte entsprechen in der gelieferten Ausführung den im Folgenden genannten einschlägigen Bestimmungen und harmonisierten Rechtsvorschriften:
The above mentioned devices correspond in the delivered condition to the relevant regulations and harmonized standards:

Angewandte EU Richtlinie:
Applied EU-Directives:
2011/65/EU Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten und Delegierte Richtlinie 2015/863
2011/65/EU Restriction of the use of certain hazardous substances in electrical and electronic equipment and Commission delegated directive 2015/863

Angewandte harmonisierte Normen:
Applied harmonized standards:
EN IEC 63000:2018

Angewandte EU Richtlinie:
Applied EU-Directives:
2014/30/EU Elektromagnetische Verträglichkeit
2014/30/EU Electromagnetic compatibility

Angewandte harmonisierte Normen:
Applied harmonized standards:
EN 61000-6-3:2007 +A1:2011 +AC:2012
EN 50130-4:2011

Angewandte EU Richtlinie:
Applied EU-Directives:
2014/34/EU Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen
2014/34/EU Equipment and protective systems intended for use in potentially explosive atmospheres

Angewandte harmonisierte Normen:
Applied harmonized standards:
EN IEC 60079-0:2018, EN 60079-11:2012,
EN 60079-26:2015, EN 60079-31:2014

Eingeschaltete benannte Stellen:
Engaged notified bodies:
DEKRA Testing and Certification GmbH 0158
Dinnendahlstraße 9
D-44809 Bochum

Zugehörige Bescheinigungen:
Certificates which are included:
BVS 12 ATEX E 088

Bei Veränderung des benannten Gegenstandes erlischt die Konformitätserklärung.
In case of modification of the designated subject, the conformity declaration is no longer valid.

Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller.
This declaration of conformity is issued under the sole responsibility of the manufacturer.

Diese Erklärung wird abgegeben durch:
This declaration has been stated by:

Art.-Nr.: 912714 ÄI04

Bad Oldesloe, den 19.07.2023

Minimax GmbH, Geschäftsführer
Managing Director Minimax GmbH
Tim Strieder

Minimax GmbH, Leiter Qualitätsmanagement
Minimax GmbH Quality Management
Torsten Bruhns

Minimax GmbH
Industriestraße 10/12
23840 Bad Oldesloe
Tel.: +49 4531 803-0
Fax: +49 4531 803-248
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Sitz der Gesellschaft: Bad Oldesloe
AG Lübeck HRB 21622 HL
USt-Ident-Nr.: DE813746399
Steuer-Nr.: 30 293 00827

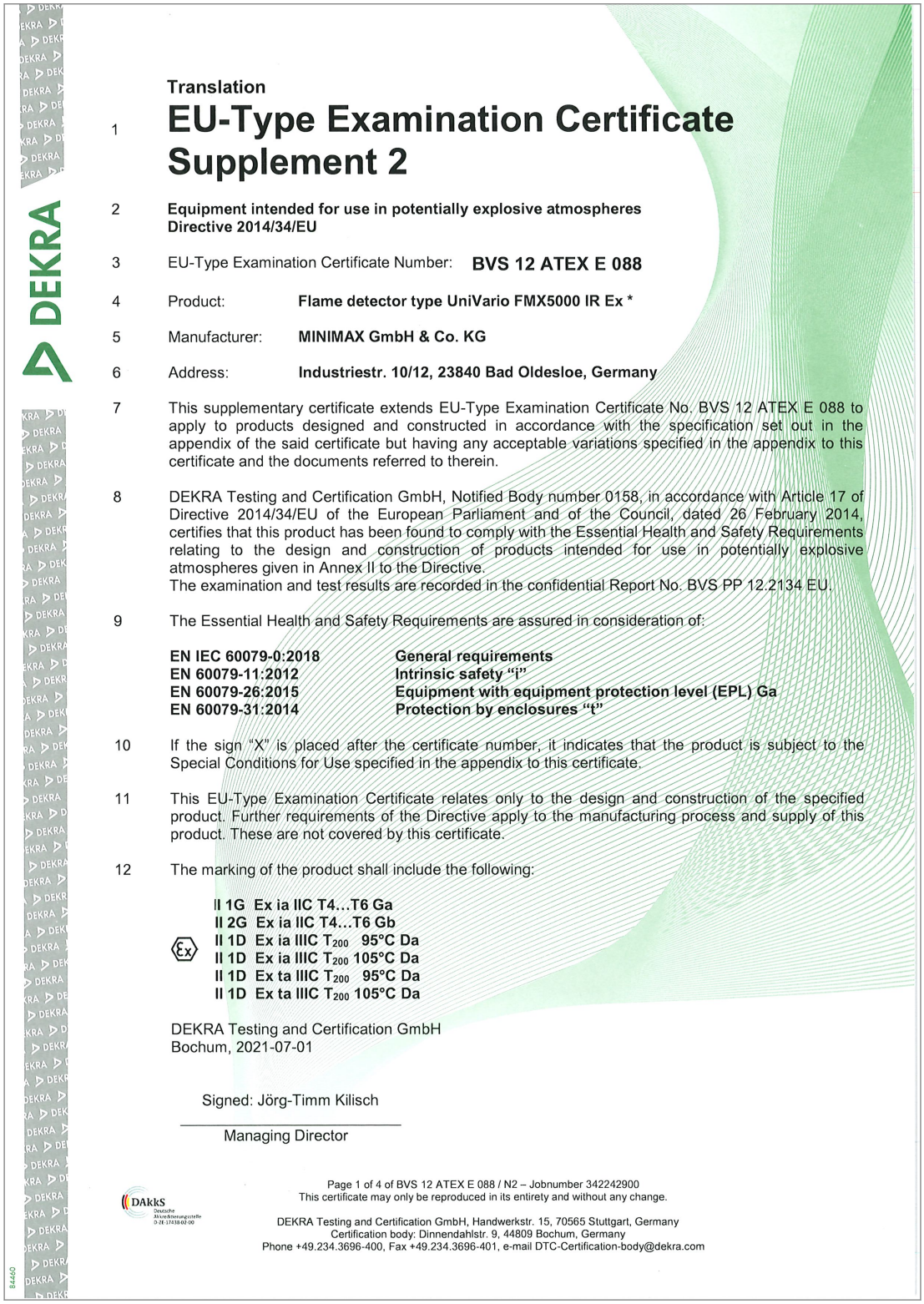
Geschäftsführer:
Dr. Volker Bechtloff (Vors.)
André Lickefett
Bogdan Schmidtschek
Tim Strieder
Vorsitzender des Aufsichtsrates:
Dr. Paul Lerbinger

UniCredit Bank AG Hamburg
BLZ 200 300 00 Kto.-Nr. 400 716 1
IBAN DE61 2003 0000 0004 0071 61
SWIFT-BIC HYVE DEMM 300

Commerzbank AG Hamburg
BLZ 200 400 00 Kto.-Nr. 498 708 700
IBAN DE48 2004 0000 0498 7087 00
SWIFT-BIC COBA DEFF XXX

Fig. 33: 91271404_CE declar FMX5000 IR Ex

B Type examination certificate



Translation

1 **EU-Type Examination Certificate Supplement 2**

2 **Equipment intended for use in potentially explosive atmospheres Directive 2014/34/EU**

3 EU-Type Examination Certificate Number: **BVS 12 ATEX E 088**

4 Product: **Flame detector type UniVario FMX5000 IR Ex ***

5 Manufacturer: **MINIMAX GmbH & Co. KG**

6 Address: **Industriestr. 10/12, 23840 Bad Oldesloe, Germany**

7 This supplementary certificate extends EU-Type Examination Certificate No. BVS 12 ATEX E 088 to apply to products designed and constructed in accordance with the specification set out in the appendix of the said certificate but having any acceptable variations specified in the appendix to this certificate and the documents referred to therein.

8 DEKRA Testing and Certification GmbH, Notified Body number 0158, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.
The examination and test results are recorded in the confidential Report No. BVS PP 12.2134 EU.

9 The Essential Health and Safety Requirements are assured in consideration of:

EN IEC 60079-0:2018	**General requirements**
EN 60079-11:2012	**Intrinsic safety "i"**
EN 60079-26:2015	**Equipment with equipment protection level (EPL) Ga**
EN 60079-31:2014	**Protection by enclosures "t"**

10 If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Special Conditions for Use specified in the appendix to this certificate.

11 This EU-Type Examination Certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

12 The marking of the product shall include the following:

II 1G Ex ia IIC T4...T6 Ga
II 2G Ex ia IIC T4...T6 Gb
II 1D Ex ia IIIC T_{200} 95°C Da
II 1D Ex ia IIIC T_{200} 105°C Da
II 1D Ex ta IIIC T_{200} 95°C Da
II 1D Ex ta IIIC T_{200} 105°C Da

DEKRA Testing and Certification GmbH
Bochum, 2021-07-01

Signed: Jörg-Timm Kilisch
Managing Director

Page 1 of 4 of BVS 12 ATEX E 088 / N2 – Jobnumber 342242900
This certificate may only be reproduced in its entirety and without any change.

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Certification body: Dinnendahlstr. 9, 44809 Bochum, Germany
Phone +49.234.3696-400, Fax +49.234.3696-401, e-mail DTC-Certification-body@dekra.com

13 Appendix

14 **EU-Type Examination Certificate**

BVS 12 ATEX E 088
Supplement 2

15 **Product description**

15.1 **Subject and type**

Flame detector type UniVario FMX5000 IR Ex *

The flame detector type FMX5000 IR Ex * is built in the following variations:

Type	Description	Type of protection
FMX5000 IR Ex	Standard Flame Detector with aluminium enclosure	II 2G Ex ia IIC T4...T6 Gb II 1D Ex ia IIIC T_{200} 95°C Da II 1D Ex ia IIIC T_{200} 105°C Da
FMX5000 IR Ex SF	Silicon free product	
FMX5000 IR Ex HR	Special enclosure coating for corrosive atmospheres	
FMX5000 IR Ex ST	Stainless steel enclosure for corrosive atmospheres	II 1G Ex ia IIC T4...T6 Ga II 1D Ex ia IIIC T_{200} 95°C Da II 1D Ex ia IIIC T_{200} 105°C Da
FMX5000 IR Ex Dust	Flame Detector for non-intrinsically safe applications	II 1D Ex ta IIIC T_{200} 95°C Da II 1D Ex ta IIIC T_{200} 105°C Da

The communication module KMX5000 AP Ex for Apollo communication line can be used in all detector types.

15.2 **Description**

The flame detector type FMX5000 IR Ex * is used for the warning of flames and fires in explosion-hazard areas of Zone 0 (with stainless steel enclosure), Zones 1, 2, 20, 21 and 22.

The flame detector senses flames with their typical flame spectrum in optical wavelength and frequency. The electronics comprises 3 sensors with a digital signal processing. A regular self-test is carried out to monitor the detectors key functions. This includes a test of the optical channels via an integrated infrared emitter. The external connection is done by terminals. A 2-wire interface is used to supply the detectors and send an alarm indication to the fire panel; optionally a second 2-wire interface can be used to send a fault indication to the fire panel.

Additionally the flame detector can be equipped with a communication module type KMX5000 AP Ex. The module transfers serial data of the detector's status via the supply circuitry e.g. to a superior fire-detection system.
Short description of the variation to the product; otherwise: "unchanged"

Reasons for this supplement:

- Updating to the current standards
- Modification of documentation

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15.3 **Parameters**

Electrical parameters
for FMX5000 IR Ex, FMX5000 IR Ex SF, FMX5000 IR Ex HR, FMX5000 IR Ex ST

Power supply circuit (UL+, UL-, Ext, Test)

Maximum input voltage	U_i	DC	28	V
Maximum input current	I_i		100	mA
Maximum input power	P_i		1.2	W
Maximum internal capacitance	C_i		360	pF
Maximum internal inductance	L_i		960	nH

Fault-Line circuit (+UF, UL-)

Maximum input voltage	U_i	DC	28	V
Maximum input current	I_i		100	mA
Maximum input power	P_i		1.2	W
Maximum internal capacitance	C_i		negligible	
Maximum internal inductance	L_i		720	nH

The power supply circuit and the fault line circuit are not galvanically isolated from each other.

Electrical parameters for FMX5000 IR Ex Dust

Rated voltage	DC	28	V
Rated current		100	mA
Power dissipation		1.2	W

Ambient temperature range

Gas applications	T_a	for T4	-40 °C up to +80 °C
		for T5	-40 °C up to +55 °C
		for T6	-40 °C up to +40 °C
Dust applications	T_a	for T_{200} 105 °C	-40 °C up to +80 °C
		for T_{200} 95 °C	-40 °C up to +70 °C

16 **Report Number**

BVS PP 12.2134 EU, as of 2021-07-01

17 **Special Conditions for Use**

None

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18 **Essential Health and Safety Requirements**

The Essential Health and Safety Requirements are covered by the standards listed under item 9.

19 **Drawings and Documents**

Drawings and documents are listed in the confidential report.

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

DEKRA Testing and Certification GmbH
Bochum, 2021-07-01
BVS-Wlo/Mu A20210205

Managing Director

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C Detector types with part numbers

The FMX5000 IR flame detectors described in this operating manual are available in the following versions:

Type	Part No.	Description
FMX5000 IR Ex	911674	Intrinsically safe flame detector with integrated function test of the optical channels via IR emitter. Aluminum housing
FMX5000 IR Ex ST	916255	Flame detector with integrated function test of the optical channels via IR emitter. Stainless steel housing

All the listed detectors are also available with a silicone-free design (suffix: SF)


9 1 2 3 1 1