



EN Fire safety solutions

SHIELD 6k8



EN Installation and user manual

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PREFACE

Using this manual

This manual is intended to be used as a work of reference for professional, well trained and authorised engineers to be able to safely install, use, maintain and repair the components of SHIELD fire safety solutions that are used for detection and suppression of fire.

This document has been divided in an installation manual and a user manual.

Pictograms and symbols

The following pictograms and symbols are used in this manual:

	TIP Suggestions and recommendations to simplify carrying out tasks and actions.
	ATTENTION! A remark with additional information for the user. A remark brings possible problems to the user's attention.
	CAUTION! Procedures, if not carried out with the necessary caution, could damage the product, the workshop or the environment.
	WARNING! Procedures which, if not carried out with the necessary caution, may damage the product or cause serious personal injury.
	WARNING! Denotes risk of electric shock.
	WARNING! Fire hazard! Important warning to prevent fire.

Text indicators

Listings indicated by "-" (hyphen) concern enumerations.
Listings indicated by "•" (bullet point) describe steps to perform.

This manual describes installation and maintenance of components for fire detection and suppression. It contains extensive commissioning instructions as well.

The user section describes the necessary maintenance activities to secure the functionality of the overall system, as well as the procedure in case a fire has occurred.

Abbreviations

In this manual, including electrical diagram, the following abbreviations are used.

Abbreviation	Meaning
EOL - EOL resistor - EOL diode	end of line - end of line resistor - end of line diode
REOL	end of line resistor
DEOL	end of line diode
RAL	alarm resistor

1 INTRODUCTION

1.1 General description

This manual describes the following products.

1.1.1 Fire detection

Products developed to detect fire at an early stage in a reliable manner. It concerns:

Detectors:

- heat detector set
- spark detector set
- smoke detector set

Fire detection panel:

- ShieldControl 6k8

1.1.2 Fire suppression

Products developed to suppress fire and constrain the risks with minimum damage to the connected filter system, harmless to environment and human. It concerns:

Valves:

- sliding valves
- solenoid valve

Aerosol fire extinguishing generators:

- FlameShield



Refer to the available product data sheets for detailed product specifications.

1.2 Product combinations

The fire detection & suppression system is supposed to be installed with:

- SparkShield (cyclone spark arrester)
- OilShield (limestone feeder)¹
- central filter system type MDB, ranging from MDB-4 to MDB-48 (other sizes on request)
- central fan type SIF
- system control panel SCP
- round ductwork of the appropriate diameter



Refer to the available application data sheet for design recommendations and selection tables.

1.3 Functional description of SHIELD fire safety solutions

Fig. 1.1

The **SparkShield**² (A) spark arrester reduces the risk of sparks, cigarette butts or other sources of ignition reaching the filter to an absolute minimum. **Inspection hatches**¹ (E) are placed around the SparkShield to monitor the system and determine the need for preventive maintenance.

The **OilShield**² (F) limestone feeder is placed between the spark arrester and the filter. Limestone is applied in small quantities and makes sticky welding fumes behave like dry welding fume, enhancing filter cleaning and filter cartridge life. The limestone reduces the risk of fire due to sparks and spontaneous combustion to a minimum.

The **ShieldControl** (J) fire detection panel processes the detection sensor signals, sets the alarm and activates the

1. Not required for dry welding and cutting fumes. Refer to the design recommendations as stated in the available application data sheet.
2. Refer to separate literature.

suppression system. In case of alarm, a **fire alarm sounder** (K) will go off. Operational reliability in the event of a power failure is assured by a battery pack. To secure the overall functionality, ShieldControl monitors open or short circuit of wiring loops of detectors and the suppression system.

When a fire is detected, the system can be activated manually at the **manual call point** (L).

Automatic detection is triggered by heat, sparks or smoke. The filter is fitted with **heat detectors** (H) above the dustbin and at the top of the filter. **Spark detectors** (C) are placed near the filter outlet and in the duct after the filter. A **smoke detector** (D), suitable for air ducts, is placed in the duct after the filter.

The inlet and outlet duct of the filter are fitted with pneumatic **sliding valves** (B). If there is a fire, the valves close and cut off the oxygen, thereby choking it. This constrains the risk of escalation. When the extraction system is switched off, the valves are closed as well to create a safe situation. The valves have reed contacts to monitor the closing function; the filter system software runs a periodic check.

The filter is fitted with one or more **FlameShield** (I) aerosol fire extinguishing generators. The generators are placed directly in the filter housing and do not require plumbing. FlameShield requires no maintenance and has a service life of 10 years. If there is a fire, FlameShield is activated by the fire detection panel after the sliding valves have closed. FlameShield self activates at 300°C (572°F). Fire suppression is rapidly achieved through interference between the aerosol and the flames' free radicals, terminating propagation of the fire. The aerosol remains active during 30 minutes after activation, thus preventing re-ignition. The amount of aerosol is proportional to the filter volume and can be easily adapted by adding generators.

The **system control panel SCP** (M) controls the filter and fan operation. If there is a fire, it will get a signal from the fire detection panel and close the sliding valves, stop the fan and shut off the supply of compressed air. The filter compressed air connection is fitted with a **solenoid valve** (G) that will allow the compressed air tanks to depressurize outside of the filter and prevent any fresh oxygen from reaching the fire.

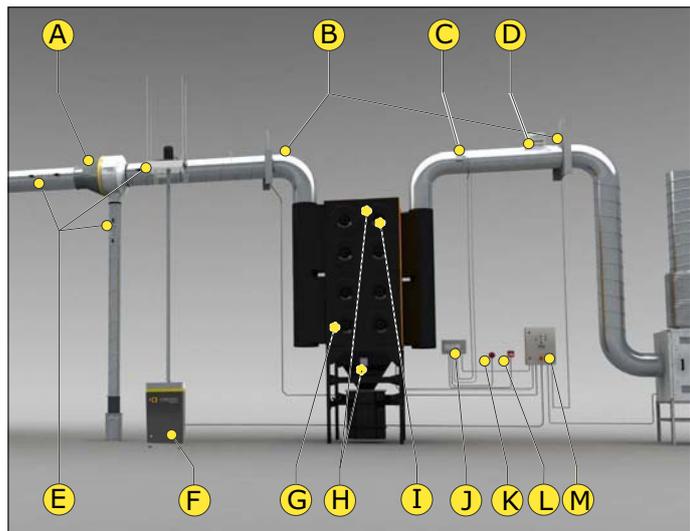


Fig. 1.1

 Refer to the available application data sheet about *SHIELD fire safety solutions* for more detailed information.

1.4 System maintenance

The entire system including the ShieldControl panel must be tested periodically in accordance with the national fire protection association requirements or the authorities having local jurisdiction.

The maintenance and testing procedure of the separate components is described in the relevant chapter.

	<p>ATTENTION! Prior to performing any test:</p> <ul style="list-style-type: none"> - notify the local fire brigade that you will be testing the fire safety system, especially when the installation is connected to the brigade control room - inform all other parties involved, e.g. staff, fire safety coordinator, alarm monitoring department/company <p>Testing the system may lead to acoustic fire alarm without activating the fire suppression method.</p>
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General instructions

If maintenance is required to any detector, the filter system or peripheral equipment, proceed as follows.

- Switch ShieldControl panel to **MANUAL ONLY**.

	<p>WARNING! Not switching to MANUAL ONLY will cause accidental activation of the FlameShield fire extinguishing generator(s).</p>
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After maintenance:

- Follow commissioning instructions.
- Switch ShieldControl panel back to **AUTO & MANUAL**.

	<p>WARNING! Not switching back to AUTO & MANUAL will disable automatic fire detection and extinguishing when the system is in operation.</p>
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2 SAFETY

General

The manufacturer does not accept any liability for damage to the product or personal injury caused by ignoring of the safety instructions in this manual, or by negligence during installation, use, maintenance, and repair of the product mentioned on the cover of this document and any corresponding accessories. Specific working conditions or used accessories may require additional safety instructions. Immediately contact your supplier if you detect a potential danger when using the product.

The user of the product is always fully responsible for observing the local safety instructions and regulations. Observe all applicable safety instructions and regulations.

User manual

- Everyone working on or with the system, must be familiar with the contents of this manual and must strictly observe the instructions therein. The management should instruct the personnel in accordance with the manual and observe all instructions and directions given.
- Never change the order of the steps to perform.
- Always keep the manual with the system.

Pictograms and instructions on the products (if present)

- The pictograms, warning and instructions attached to the products are part of the safety features. They must not be covered or removed and must be present and legible during the entire life of the products.
- Immediately replace or repair damaged or illegible pictograms, warnings and instructions.

Users

- The use of this system is exclusively reserved to well authorised, trained and qualified users. Temporary personnel and personnel in training can only use the system under supervision and responsibility of skilled engineers.
- The system is not to be used by children or persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
- Children must be supervised not to play with the system.

Intended use¹

The system has been designed exclusively for reducing the risk of filter fires. In the event of fire, it detects and suppresses fires at an early stage, thus minimising consequential damage. Using the system for other purposes is considered contrary to its intended use. The manufacturer accepts no liability for any damage or injury resulting from such use. The product has been built in accordance with state-of-the-art standards and recognised safety regulations. Only use this system when in technically perfect condition in accordance with its intended use and the instructions explained in the installation manual. Intended use is limited to fire risk and does not involve explosion risk.

Technical specifications

The specifications given in this installation manual must not be altered.

Modifications

Modification of (parts of) the product is not allowed.

Product combinations

Since the products are used in combination with other products and machines, the safety instructions in the documentation of these products also apply.

Installation

- The installation of these products is exclusively reserved to well authorised, trained and qualified engineers.
- Electric connection to be executed in accordance with local requirements. Ensure compliance with the EMC regulatory arrangements.
- During installation, always use Personal Protective Equipment (PPE) to avoid injury. This also applies for persons who enter the work area during installation.
- Use sufficient climbing gear and safety guards when working on a higher level than 2 meters (local restrictions may apply).
- Never install any product in front of entrances and exits which must be used for emergency services.
- Mind any gas and water pipes and electric cables.
- Make sure the wall, ceiling or support system is strong enough to carry each of the products.
- Ensure the workspace is well illuminated.
- Use common sense. Stay alert and keep your attention to your work. Do not install the product when you are under the influence of drugs, alcohol or medicine.
- Make sure that the workshop, in the vicinity of the product, contains sufficient approved fire extinguishers.



WARNING

Observe the national fire protection association requirements or the authorities having local jurisdiction.

Service, maintenance and repairs

- Observe the maintenance intervals given in this manual. Overdue maintenance can lead to high costs for repair, false fire alarm and revisions and can render the guarantee null and void.
- During service, maintenance and repair jobs, always use Personal Protective Equipment (PPE) to avoid injury. This also applies for persons who enter the work area.
- Always use tools, materials, lubricants and service techniques which have been approved by the manufacturer. Never use worn tools and do not leave any tools in or on the product.
- Safety features which have been removed for service, maintenance or repairs, must be put back immediately after finishing these jobs and it must be checked that they still function properly.
- Use sufficient climbing gear and safety guards when working on a higher level than 2 meters (local restrictions may apply).
- Ensure the workspace is well illuminated.

1. "Intended use" as explained in EN-ISO 12100-1 is the use for which the technical product is suited as specified by the manufacturer, inclusive of his directions in the sales brochure. In case of doubt it is the use which can be deduced from the construction, the model and the function of the technical product which is considered normal use. Operating the machine within the limits of its intended use also involves observing the instructions in the user manual.

3 OPERATION IN CASE OF FIRE

The fire suppression system can be activated in two ways:

- automatically by heat, sparks and/or smoke detectors
- manually at manual call point



If there is a fire, the automatic sequence of events is as follows:

- acoustic fire alarm goes off
- fan motor is switched off
- release of compressed air through solenoid valve

After a delay of ± 5 seconds:

- sliding valves close
- release of aerosol by FlameShield generators during 60 seconds

After activation, the FlameShield aerosol remains active for at least 30 minutes to prevent re-ignition of the fire. In this way, damage to the filter installation, as well as consequential loss is kept to a minimum.



WARNING!

All staff must be familiar with the fire procedures.

4 INSTALLATION (GENERAL)

4.1 MDB filter system

Before installing the components of SHIELD fire safety solutions, make sure the Cart-D filter cartridges of the connected MDB filter system are properly installed. To check this, refer to the corresponding manual.

- Securely check the installation of the Cart-D filter cartridges.



WARNING!

Improper installation of the Cart-D filter cartridges will cause internal leakage and a reduced filter efficiency. In combination with SHIELD fire safety solutions it can lead to a false fire alarm.

4.2 Tools and requirements

- connection wire: 5 x 0.5 mm²
- connection wire: 5 x 0.5 mm² shielded cable
- electric drill
- self-tapping screws
- screws min. 5 mm + fixings
- metal cable glands
- duct support material (depending on weight of sliding valves)
- lifting and climbing gear
- existing duct: angle grinder or jigsaw

4.3 Installation and commissioning

To avoid accidental fire alarms and the activation of FlameShield fire extinguishing generators, the following installation and commissioning sequence should be followed. Deviation from this sequence is allowed, provided the FlameShield module(s) is/are always the last to be connected, even after having performed the functional tests.

1. Filter/fan installation
2. System control panel SCP
3. ShieldControl panel (**without power**)
4. Detectors (heat, sparks, smoke)
5. Valves (sliding valves + solenoid valve)
6. FlameShield fire extinguishing generators (**isolated**)

- Refer to chapter 14 for extensive commissioning checklist.

4.4 Functional test

To perform any functional test, the following instructions should be followed.

- Ensure that the ShieldControl panel is in **MANUAL ONLY** mode.
- Ensure that the FlameShield module(s) is/are isolated.
- Perform detector test. Sound alarm will go off.
- Check fire zone (**FIRE IN ZONE**).
- Press the **SILENCE/SOUND ALARM** button on the ShieldControl panel to suppress alarm.
- Turn the **ENABLE CONTROL** key right.
- Press the **RESET** button.
- Turn the **ENABLE CONTROL** key to the left.

To proceed with testing:

- Restart procedure.

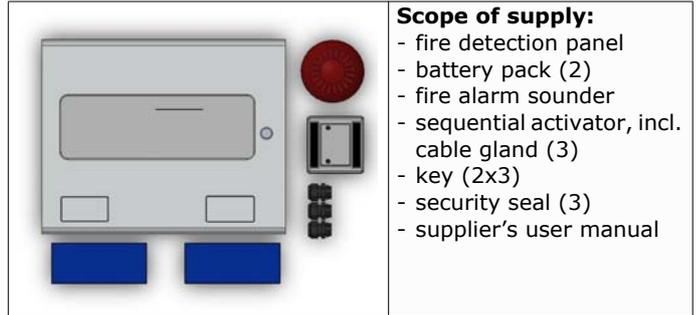
If testing has been completed:

- Reconnect the FlameShield module(s).
- Switch the ShieldControl panel to **AUTO & MANUAL**.



The **ENABLE CONTROL** key must be in the vertical position (=control disabled) to perform any test.

5 SHIELDCONTROL 6K8



Scope of supply:

- fire detection panel
- battery pack (2)
- fire alarm sounder
- sequential activator, incl. cable gland (3)
- key (2x3)
- security seal (3)
- supplier's user manual

5.1 Product description and operation

ShieldControl 6k8 is a fire detection panel¹ with an integrated manual call point. It has three detection zones and an additional manual call point entry all of which are capable of activating the FlameShield fire extinguishing generators. The fire detection panel makes it possible to connect additional manual call points.

ShieldControl monitors the input from detectors and manual call point on short circuits by a 470 ohms alarm resistor placed in series with the switching contact circuit.

ShieldControl has two back-up batteries to allow for continuous operation in the event of power failure.

5.2 Installation

To be sourced locally:

- connection wire: 5 x 0.5 mm² shielded cable
- screws min. 5 mm + fixings
- metal cable glands

5.2.1 Sequential activator

FlameShield fire extinguishing generators must be connected via sequential activators. Each sequential activator can have two generators connected. The last activator must be fitted with an EOL diode.

Fig. 5.1 and Fig. 5.2

- Mount the sequential activator(s) at an appropriate position, e.g. near the ShieldControl panel.
- Connect the sequential activators in accordance with the electrical diagram;
 - 1 FlameShield module: connect A+ and B- as per Fig. 5.1
 - 2 or more FlameShield modules: connect A+ and A-; B+ and B- as per Fig. 5.2
- Mount an EOL diode (A) on the last sequential activator. Ensure the correct position/direction of this diode (ref. marking).

1. Compliance with European standards EN 54-2, EN 54-4 and EN 12094-1

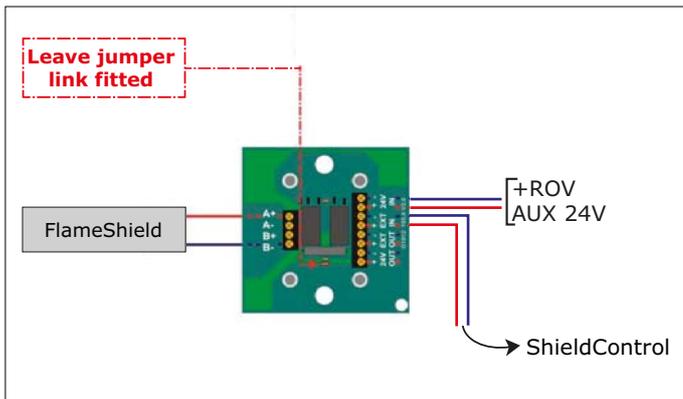


Fig. 5.1

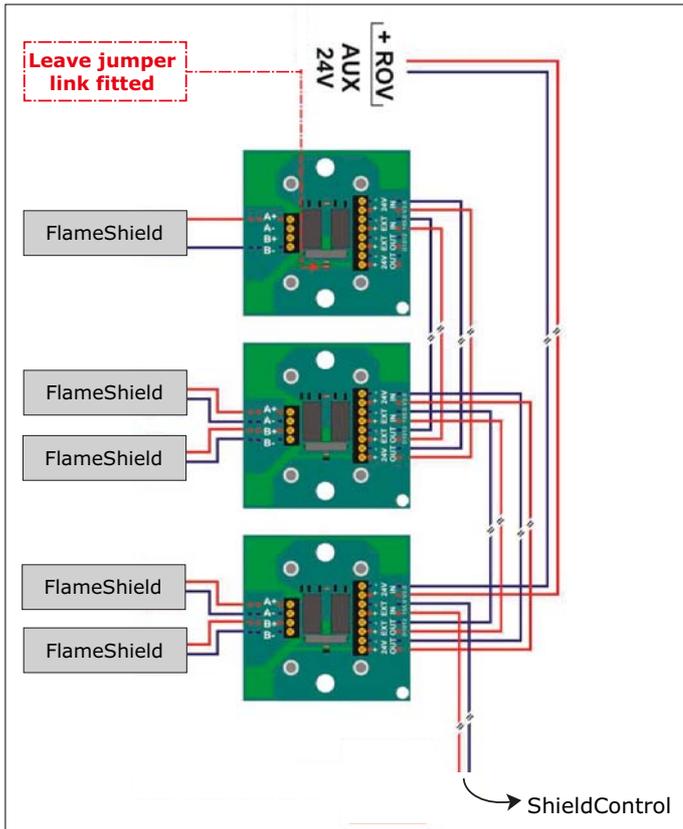


Fig. 5.2

5.2.2 ShieldControl panel

Location

- on the wall or at a convenient location close to the filter installation
- at eye level
- indoors

WARNING
 To prevent damage, do **not** mount the ShieldControl panel close to sources of excessive heat.

Ambient conditions

- Min. temperature: -5°C (23°F)
- Max. temperature: +40°C (104°F)
- Relative humidity: max. 95%

The ShieldControl housing is IP 30 rated. It must be shielded from excessive dust, welding sparks and grinding sparks, if any, by e.g. an enclosure.

Installation

To install the ShieldControl panel, proceed as follows.

- Mount the ShieldControl panel at all three mounting points using screws min. 5 mm. Use suitable fixtures so that the panel cannot move after it has been installed.

WARNING
 If mounted in an enclosure or similar, the integrated manual call point will not be freely accessible. An additional manual call point must therefore be mounted near the enclosure (ref. chapter 6).

5.3 Fire alarm sounder

Installation, tone selection and volume control of the fire alarm sounder are described in the installation manual supplied with the product.

- Mount the fire alarm sounder at an appropriate position.
- Select the desired tone.
- Adjust the noise to the desired level.

5.4 Electrical connection

Fig. 5.3

ShieldControl (D) must be wired to:

- heat detector set(s) (J)
- spark detector set (H)
- smoke detector (I)
- fire alarm sounder (included in ShieldControl package) (C)
- additional manual call point(s), if any (B)
- sequential activator(s) (K)
- system control panel SCP (E)

ShieldControl activates:

- FlameShield fire extinguishing generator(s) (A)
- fire alarm sounder (C)
- system control panel SCP (E)

System control panel SCP (E) activates:

- sliding valves (G)
- solenoid valve (F)

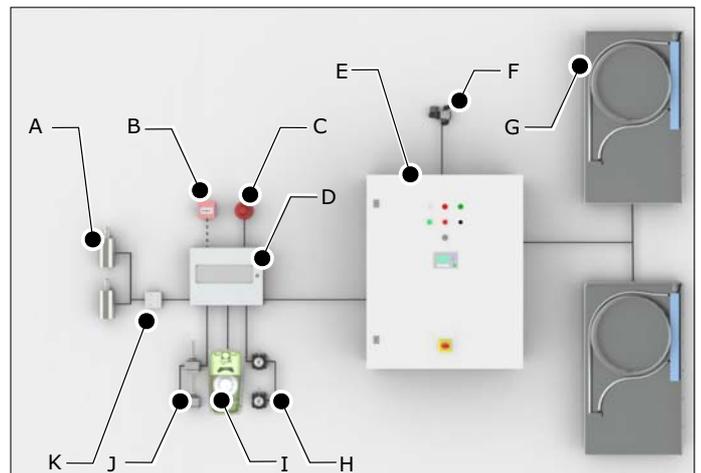


Fig. 5.3

All connections for field wiring are to a single row of terminals along the top of the PC board.

Cables to be used:

- 5 x 0.5 mm² shielded cable for detectors and manual call point
- 5 x 0.5 mm² normal cable for other wiring

The resistance of any core of any cable should not exceed 25 ohm (>500 m for 0.5 mm²).

To connect the cables to the ShieldControl panel, use suitable metal cable glands fitted to the knock-outs provided.

- Connect all cables to the ShieldControl panel in accordance with the electrical diagram on page 32.

The wiring of the detectors, manual call point, FlameShield and fire alarm sounder is monitored for open and short circuit fault conditions.

5.4.1 Battery packs

The ShieldControl panel is fitted with battery leads wired to the PC board to connect the two battery packs.

- Place both battery packs inside the ShieldControl panel.
- Connect them to the battery leads.

	WARNING It is extremely important for the polarity of the batteries to be connected correctly. Incorrect connections could damage the ShieldControl panel.
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5.4.2 Mains supply

The mains supply of 230V AC must be connected to a clean group or to a group that is not connected to equipment likely to cause frequent power failures.

- Connect the ShieldControl panel to the mains in accordance with the electrical diagram on page 32.

5.5 Maintenance

The ShieldControl panel itself does not require specific maintenance except for cleaning. Do not use solvents or detergents and ensure that water cannot enter the enclosure.

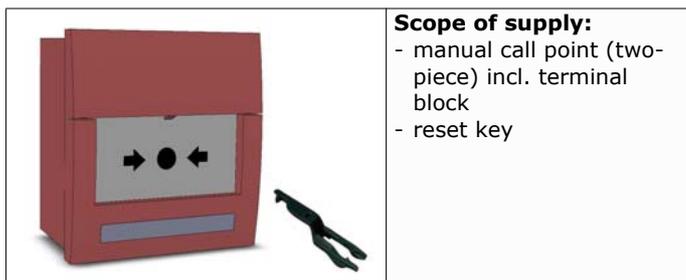
Component	Action	Frequency:		
		when-ever dirty	every year	every 4 years
ShieldControl panel	Clean the outside using a barely damp cloth.	X		
Battery packs	Test batteries; POWER FAULT LED must be off.		X	
	Replace batteries.			X

Settings

ShieldControl is programmed for automatic activation of the FlameShield generators five seconds after one of the detectors or manual call point has been activated. The activation duration time is 60 seconds.

Code	Function
C16	Z1, Z2 or Z3 detectors trigger automatic release.
CA3	Z3 device alarm must be present for 30 seconds
-20	20 seconds extinguishing delay.
060	Aerosol extinguishant duration time in seconds.

6 MANUAL CALL POINT (OPTION)



Scope of supply:

- manual call point (two-piece) incl. terminal block
- reset key

6.1 Product description and operation

Switch to manually activate the fire alarm and fire suppression system. It is used in addition to or instead of the integrated manual call point on the ShieldControl panel.

6.2 Installation

Location

- at a position where it will be easy for the operator to reach it
- indoors



ATTENTION

Do **not** install the manual call point at the connected filter system. It might not be accessible if there is a fire.

6.3 Electrical connection

To be sourced locally:

- connection wire: 5 x 0.5 mm² shielded cable

Fig. 6.1

- Connect the manual call point to the ShieldControl panel in accordance with the electrical diagram on page 32.
- Take EOL resistor 6k8 ohm from terminal strip of ShieldControl and place it on the terminal block in the manual call point. Use terminal that is connected to the 470 ohm resistor.

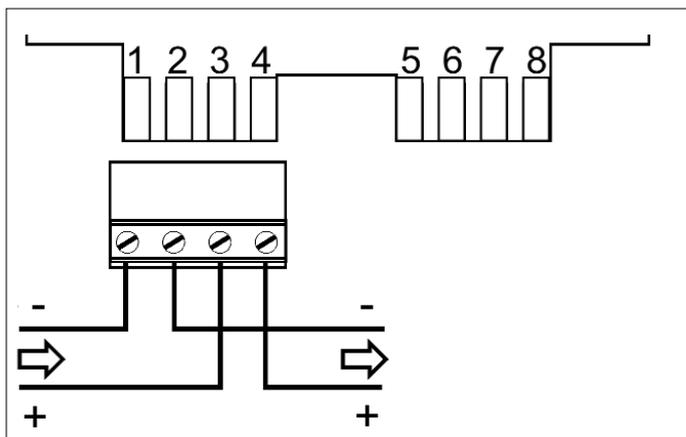


Fig. 6.1



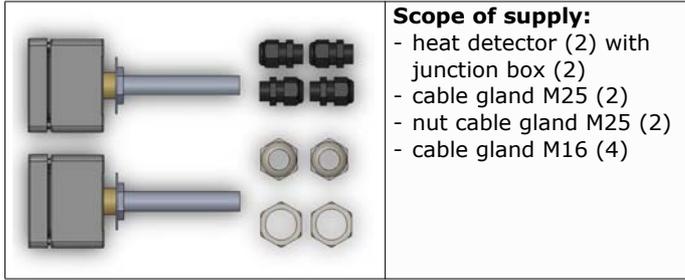
WARNING

Failure to place the alarm resistor in the switch line will lead to a failure in case of fire alarm. The ShieldControl panel needs this resistor to detect the difference between a short circuit and a real fire alarm. Without this resistor the ShieldControl will give a failure signal (LED ALARM/FAULT WARNING SILENCED is lit) but not activate the fire alarm.

6.4 Reset

Refer to paragraph 18.2.1 on page 26 for the reset procedure.

7 HEAT DETECTOR SET



7.1 Product description and operation

Set of two temperature detectors to be installed in the filter housing. When measuring a temperature of 88°C (190°F) or more, they give a signal to the connected fire detection panel ShieldControl to activate the fire suppression system.

7.2 Installation

Location:

Fig. 7.1

- 1st heat sensor: on top of filter housing (A)
- 2nd heat sensor: in hopper just above dustbin (B)
- 1 heat detector set per filter module (# hoppers = # heat detector sets)

Refer to the available application data sheet about *SHIELD fire safety solutions* for the required number of heat detector sets per filter type.

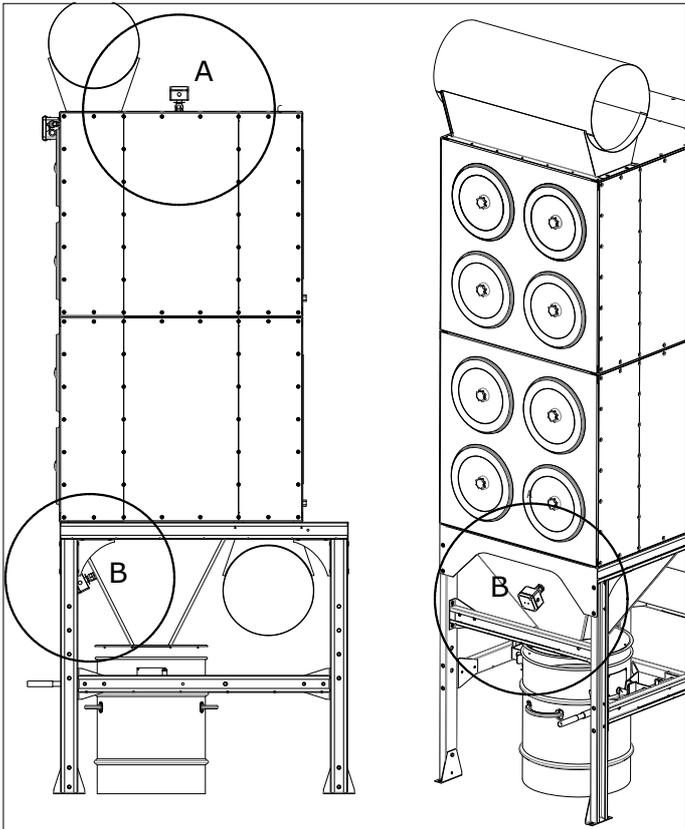


Fig. 7.1

Fig. 7.2

- Mount the heat sensors in the filter housing(s) + hopper(s);
A = housing
B = hopper.

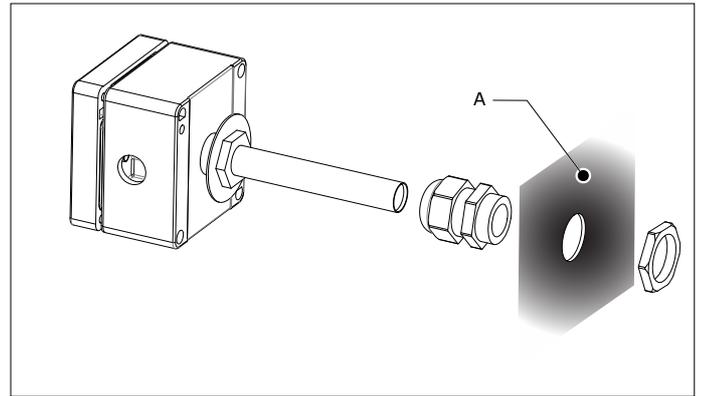


Fig. 7.2

7.3 Electrical connection -Zone 2-

To be sourced locally:

- connection wire: 5 x 0.5 mm² shielded cable

Wiring

One or more sets of temperature detectors must be wired in parallel. The detectors act as one sensor and are connected to Zone 2 (ref. electrical diagram on page 32).

End of line resistor (REOL)

The last detector that is wired to the fire detection panel ShieldControl must be fitted with an EOL resistor according to Fig. 7.3. The EOL resistor of the heat detector is supplied with the fire detection panel and can be found in Zone 2 of the relevant terminal.

- Take the EOL resistor from Zone 2 of the ShieldControl panel and place it in the last heat detector according to Fig. 7.3.

Fig. 7.4 shows the first heat sensor without EOL resistor.

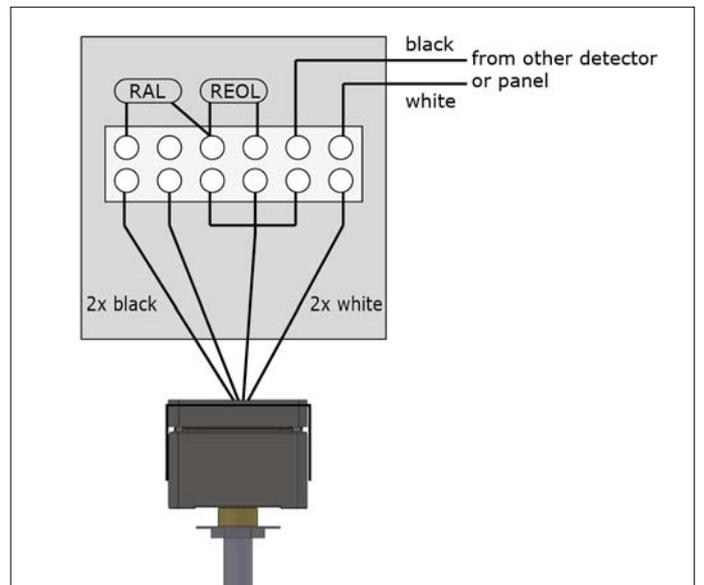


Fig. 7.3: Heat sensor with EOL resistor (REOL)

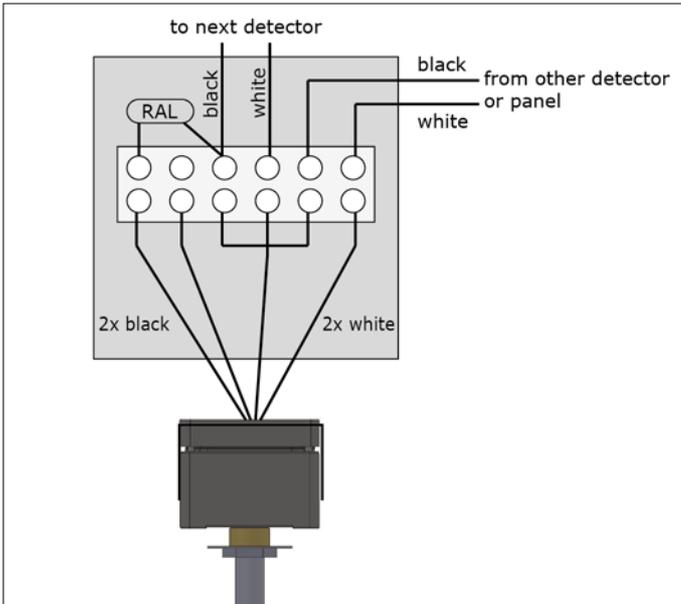


Fig. 7.4: Heat sensor no EOL resistor

The EOL resistor makes it possible for the fire detection panel to monitor the wiring for open and short circuit.

Alarm resistor

The heat detectors are fitted with a 470 ohm alarm resistor (RAL) placed in series with the switching contact circuit. The heat sensors need to be fitted with these alarm resistors to monitor the difference between a short circuit and a fire alarm. In the event of short circuit, the ShieldControl panel will give a fault but will not activate the alarm.

- Connect the heat sensors in accordance with the electrical diagram on page 32. Use shielded cables.

	WARNING Installing the alarm resistor is mandatory. Leaving out this resistor will lead to malfunction of the fire detection panel. The ShieldControl panel will not recognize the fire alarm and not activate the fire suppression system.
	WARNING Not using shielded cables can lead to a false alarm by external high voltage sources and might activate the alarm.

7.4 Functional test

	ATTENTION! Notify all parties involved that you will be testing the fire safety system; refer to paragraph 1.4.
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The operation of the heat detectors can be checked in two ways;

by measuring the ohm resistance:

- Gently heat the detectors using a heat gun or heat lamp.

by connecting them to the fire detection panel:

- Gently heat the detectors using a heat gun or heat lamp.
- Check the system status. ShieldControl should indicate a fire in Zone 2.

	WARNING Do not overheat the setpoint of the detector by more than 55°C (131°F) because this can change the default temperature setting.
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To perform the test, proceed as follows.

- **Observe the functional testing instructions as described in paragraph 4.4.**
- Functionally test all heat detectors.
- Allow the detectors to cool down.
- Reconnect the heat detectors.

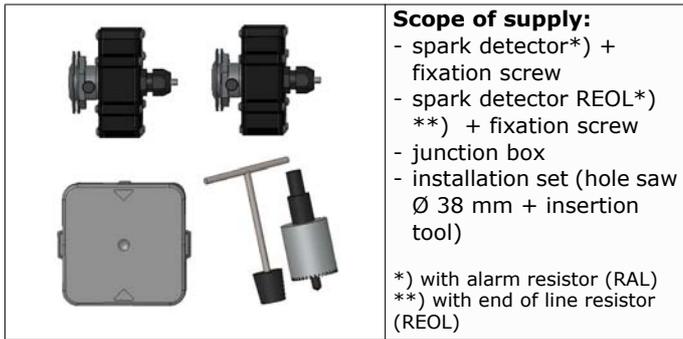
7.5 Maintenance

To be able to operate properly, the heat detectors must be kept clean. They should be tested periodically in accordance with the national fire protection association regulations or as directed by the authorities having local jurisdiction.

- Clean the detectors regularly and gently.
- Test detectors for proper functioning; refer to paragraph 7.4.
- Place detectors back in the filter housing.

Any detector that has been involved in a fire, abused or damaged must be tested and replaced if necessary.

8 SPARK DETECTOR SET



8.1 Product description and operation

Set of two infrared spark detectors. The spark detectors are sensitive to the near IR light between 0.4 to 1.1 microns wavelength.

When glowing particulate from the burning filter enters the field of view of the detector, the detector responds by sending an alarm to the ShieldControl fire detection panel.

8.2 Installation

Location:

- in filter outlet duct
- face to face (180° apart from each other) in the same vertical plane
- min. 2,5x duct diameter from bend or branch

WARNING
 To avoid dirtying the lens, never mount the spark detectors on the bottom of the duct.

The spark detectors can be mounted without having access to the inside of the duct. In this case you will need the supplied insertion tool.

Installation is easier if the inside of the duct is accessible.

In case of a new or disconnected duct **allowing access to the inside**, proceed as follows.

Fig. 8.1

- Make a hole Ø 38 mm (1.5 in.) in the duct using the supplied hole saw.
- Mount the flange (D) in the duct using the split washer (C), washer (B) and nut (A).
- Tighten washer and nut on the flange.

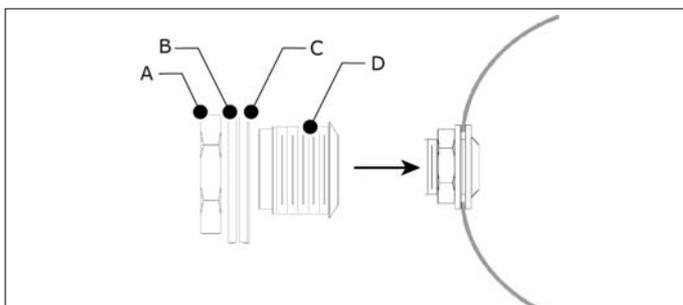


Fig. 8.1

In case of **no access to the inside** of the duct, proceed as follows.

Fig. 8.2

- Make a hole Ø 38 mm (1.5 in.) in the duct using the supplied hole saw.
- Slip nut (B), washer (C) and split washer (D) on the insertion tool (A) until the tool fits tightly on the flange (E). The nut

- and washer should be loose on the shaft of the tool.
- Push the flange completely through the hole in the duct and insert the split washer by rotating it into the inside of the duct.
- Gently pull the flange back through the hole with the insertion tool so it rests against the split washer inside the duct.
- Tighten washer and nut on the flange.
- Remove the insertion tool by loosening the wing nut and pulling straight back and twisting if required.

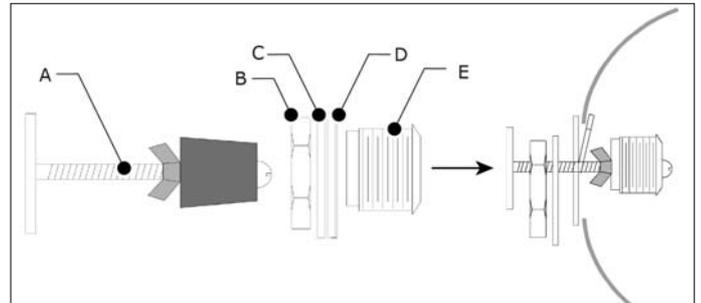


Fig. 8.2

Fig. 8.3

- Insert the spark detector lens (A) into the flange (C).
- Fasten the detector using the supplied fixation screw (B).
- Follow the same procedure for the second spark detector.

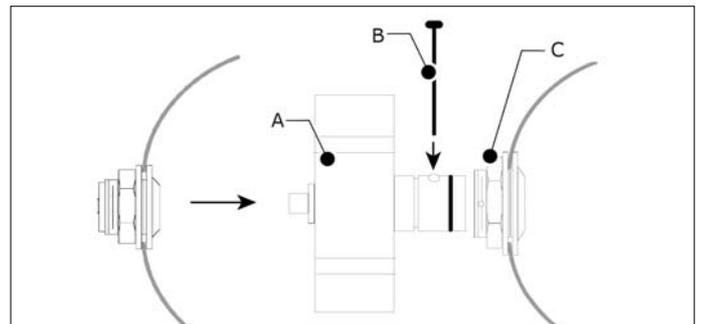


Fig. 8.3

WARNING
 To prevent false alarms, ensure that no light can get between the flange and the duct. Seal any holes with metal foil. Do **not** use duct tape since this may let through infrared light.

8.3 Electrical connection -Zone 1-

To be sourced locally:

- connection wire: 5 x 0.5 mm² shielded cable

Wiring

Fig. 8.4

The spark detectors (A) must be wired in parallel in the supplied junction box (B). Each set consists of one spark detector with EOL resistor ("EOL") and one without ("no EOL"), which is marked on the spark detector housing.

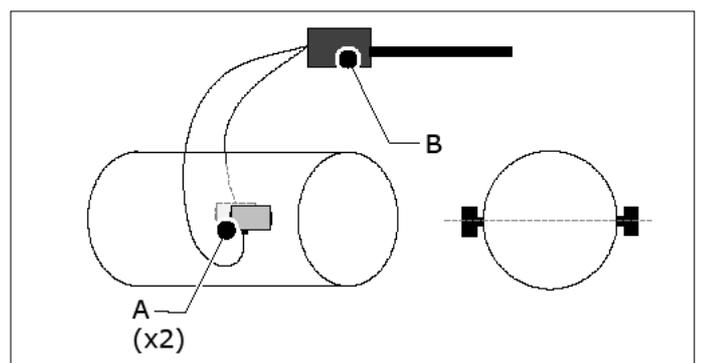


Fig. 8.4

- Mount the spark detector "EOL" in parallel after the one without ("no EOL") according to the electrical diagram on page 32.

The spark detectors are provided with the following coloured wires:

Colour codes wiring	
Red	+24 VDC
Black	0 VDC
White	24 V SIGNAL or ZONE +
Blue	ZONE -
Brown	TEST
Green	earth/ground

- Connect the red and black wire to the 24V auxiliary connection of the ShieldControl fire detection panel.
- Connect the white and blue wire to Zone 1 of the ShieldControl panel.
- Connect the green wire to earth/ground.

The EOL resistor over Zone 1 of the ShieldControl panel has become obsolete and has to be removed because it is already pre-mounted in the spark detector.

- Remove the EOL resistor over Zone 1.

	WARNING To prevent a malfunction of the spark detector, ensure that the green earth/ground wire is properly connected.
	WARNING Failure to remove the EOL resistor over Zone 1 will disable the monitoring function.

8.4 Functional test

	ATTENTION! Notify all parties involved that you will be testing the fire safety system; refer to paragraph 1.4.
------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------

The easiest way to test the spark detectors is to expose them to daylight. Both detectors must be tested separately before the system is put into operation.

To perform the test, proceed as follows.

- **Observe the functional testing instructions as described in paragraph 4.4.**
- Loosen the fixation screw and remove one of the spark detectors. That will expose the sensor to daylight.
- Check the system status. ShieldControl should indicate a fire in Zone 1.
- Replace the spark detector and fasten it using the fixation screw.
- Press the **RESET** button on the ShieldControl panel.
- Follow the same procedure for the other spark detector.

	ATTENTION The spark detectors must be tested one by one to make sure they both react to daylight.
------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------

8.5 Maintenance

To be able to operate properly, the spark detectors must be kept clean. Dirty lenses might influence their sensitivity. Both detectors must be cleaned and tested periodically in accordance with the national fire protection association regulations or the authorities having local jurisdiction.

Cleaning intervals differ per situation and regular checks need to be performed to set the cleaning interval for your specific situation.



WARNING

The ShieldControl panel must be in **MANUAL ONLY** mode to avoid unintentional activation of the fire suppression system.

To clean and test the spark detectors, proceed as follows.

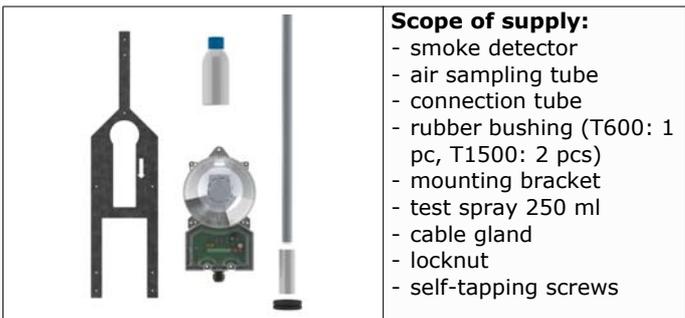
- Make sure the ShieldControl panel is in **MANUAL ONLY** mode.
- Loosen the fixation screw and remove one of the spark detectors.
- Clean the lens gently with a soft cloth or similar. In this way it is exposed to daylight at the same time (ref. paragraph 8.4).
- Check the system status. ShieldControl should indicate a fire in Zone 1.
- Replace the spark detector and fasten it using the fixation screw.
- Press the **RESET** button on the ShieldControl panel.
- Follow the same procedure for the other spark detector.

If in both cases a fire is detected in Zone 1 of the ShieldControl panel, the spark detectors are functioning properly. If no detection takes place, the lens might still be polluted or the spark detector is broken.

- Clean and test once more.
- If necessary: replace the broken spark detector.
- Put the ShieldControl panel in **AUTO & MANUAL** mode.

Any detector that has been involved in a fire, abused or damaged must be tested and replaced if necessary.

9 SMOKE DETECTOR



- Scope of supply:**
- smoke detector
 - air sampling tube
 - connection tube
 - rubber bushing (T600: 1 pc, T1500: 2 pcs)
 - mounting bracket
 - test spray 250 ml
 - cable gland
 - locknut
 - self-tapping screws

9.1 Product description and operation

Detector for smoke detection, based on light scattering by air sampling tube. The sampling tube transports the air to the smoke detector. When smoke is detected for more than 30 seconds¹, it triggers an alarm. The smoke detector is fitted with the following features:

Fig. 9.1

- A Opening for test spray
 B Sensor LED (2);
 - **LED is off:** sensor is OK
 - **LED is on:** sensor must be replaced
 C Service indicator: status LEDs that indicate the sensor contamination;
 - **green LED is on:** sensor is OK
 - **yellow LED is flashing:** sensor is 75% contaminated
 - **red LED is on:** sensor is 100% contaminated

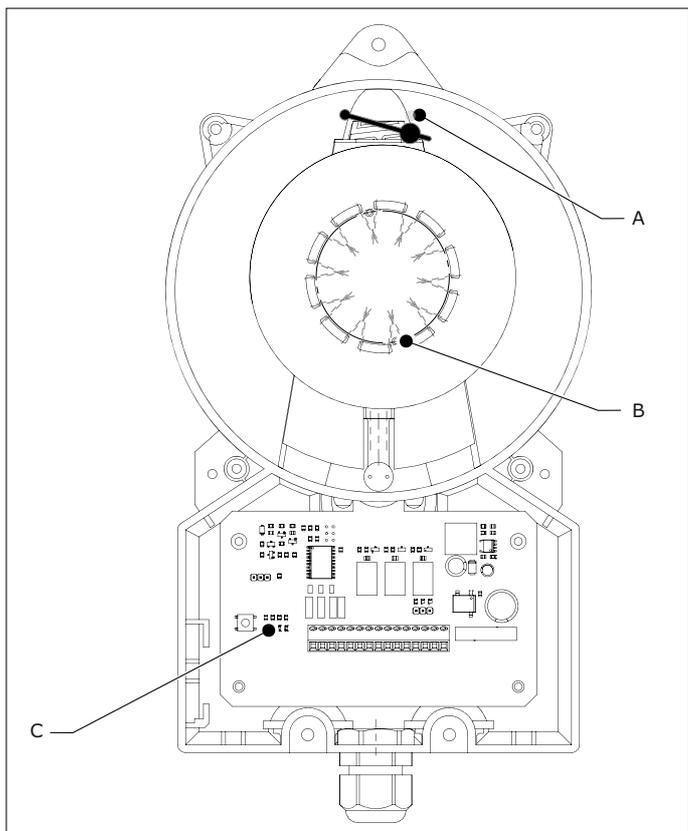


Fig. 9.1

1. Alarm delay time of 30 seconds

The smoke detector enters into alarm when it has detected smoke for more than 30 seconds continuously. This feature prevents the smoke detector to be activated unintentionally by fluctuations in filter efficiency, which makes it pre-eminently suitable for use in filter systems.

9.2 Installation



ATTENTION

Particularly in case of a new installation, the inside of the duct can be polluted, e.g. by remainders of duct mounting material. Before installation of the smoke sensor, the duct must be flushed to avoid unnecessary pollution of the smoke sensor.

The smoke detector is available with two different air sampling tube lengths, that are suitable for different duct diameters;

Type	T600	T1500
Length of air sampling tube	600 mm (23.6 in.)	1500 mm (59.6 in.)
Suitable for duct diameter	< 630 mm (25 in.)	≥ 630 mm (25 in.)
Penetration of air sampling tube through duct	± 90%	100%

Location:

- on filter outlet duct (airflow >1 m/s)
- min. 3x duct diameter before a change in duct direction or damper; min. 5x duct diameter after these devices
- before or after the sliding valve, whatever is practical
- any position on the duct (top/bottom/front/back)
- in line with the airflow direction; refer to Fig. 9.4.

It is recommended to mount the smoke detector on the front side of the duct in view of the visibility of the status LEDs. In case the LEDs are not (clearly) visible, an external light tower must be installed as additional warning device to indicate the sensor contamination.

To mount the smoke detector, proceed as follows.

- Drill a hole Ø 51 mm (2 in.) in the duct at the intended mounting position.
- Determine the correct tube length according to the table below.

Duct diameter		Length of air sampling tube	
Ø 200 mm	Ø 8 in.	± 280 mm	± 11 in.
Ø 250 mm	Ø 10 in.	± 325 mm	± 13 in.
Ø 315 mm	Ø 12 in.	± 385 mm	± 15 in.
Ø 400 mm	Ø 16 in.	± 460 mm	± 18 in.
Ø 500 mm	Ø 20 in.	± 550 mm	± 22 in.
Ø 630 mm	Ø 25 in.	± 750 mm	± 29.5 in.
Ø 700 mm	Ø 28 in.	± 820 mm	± 32.5 in.

Fig. 9.2

- Remove the end cap (A).
- Shorten the length of the air sampling tube at the side of the removed end cap;
 - do **not** cut the other side of the tube.
- Reinsert the end cap.

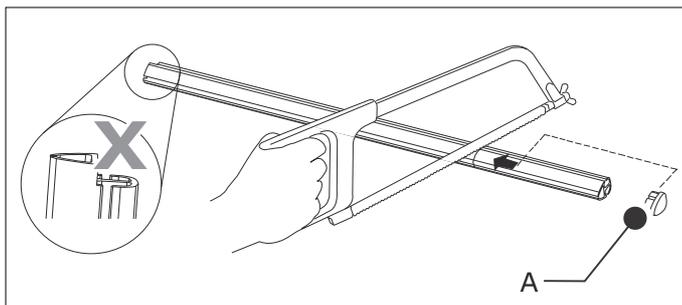


Fig. 9.2



ATTENTION

To prevent the smoke detector from malfunctioning, the end cap must always be installed.

Fig. 9.3

- Put the air sampling tube (C) in the connection tube (B).
- Insert the connection tube in the housing of the smoke detector.
- Secure the tubes with the locking screw (A).

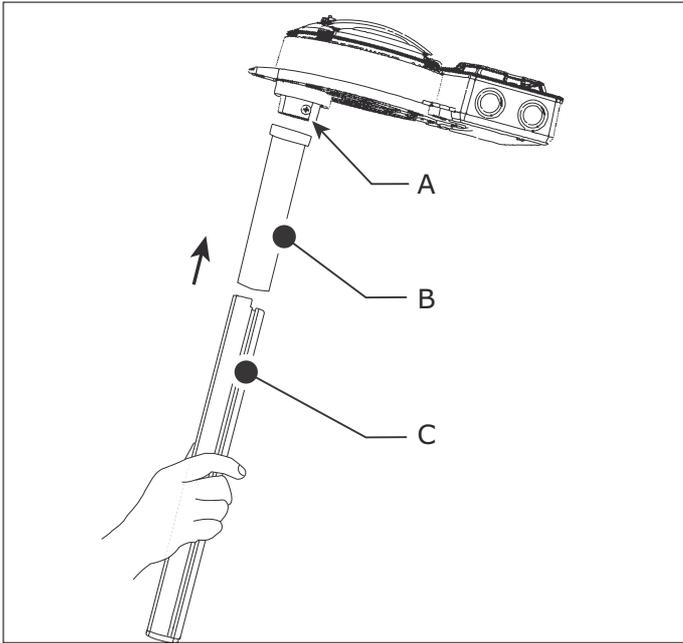


Fig. 9.3

Fig. 9.4

- Bend the mounting bracket (C) to fit the duct diameter in question.
- Install the smoke detector housing (A) on the mounting bracket.
- Put the rubber bushing (D) in the hole of the duct.

Duct diameter < 630 mm (25 in.)

- Insert the air sampling tube (B) through the rubber bushing.
- Install the mounting bracket on the duct with the supplied self tapping screws. The arrow on the mounting bracket must correspond with the airflow direction through the duct.

Duct diameter ≥ 630 mm (25 in.)

- Drill another hole Ø 51 mm (2 in.) in the opposite of the duct.
- Put the other rubber bushing (E) in the hole of the duct.
- Insert the air sampling tube (B) through both rubber bushings.

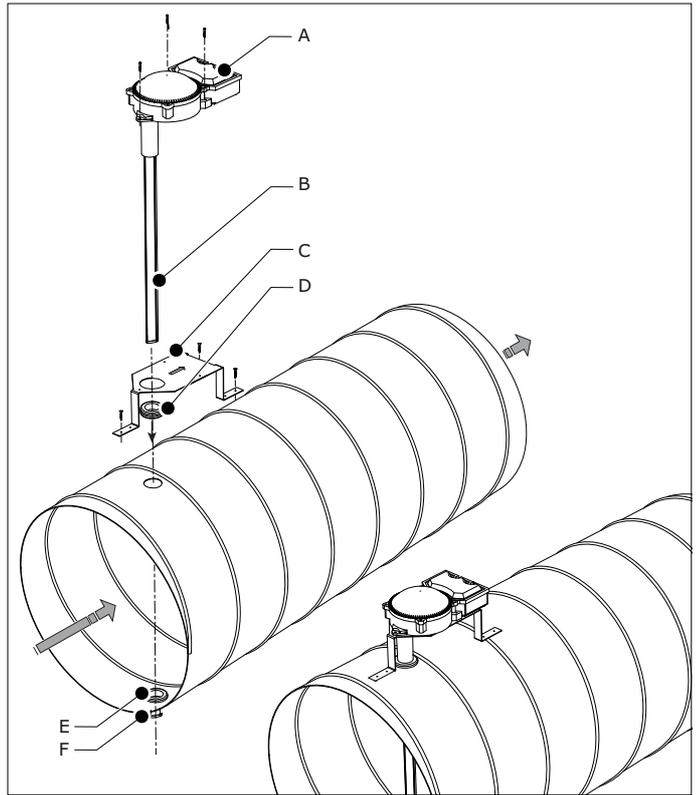


Fig. 9.4



WARNING!

The airflow direction of the smoke detector must be correct to ensure proper functioning.

Post installation checks

- Check that all screws are tightened.
- Check that the airflow direction corresponds with the arrow on the mounting bracket.
- Check that the test opening is closed by the cap.

9.3 Electrical connection -Zone 3-

To be sourced locally:

- connection wire: 5 x 0.5 mm² shielded cable

Fig. 9.5

Wiring

The smoke detector must be connected in accordance with the electrical diagram on page 32. Use shielded cables.

- Connect terminals 11 and 13 of the smoke detector to Zone 3 of the ShieldControl panel.
- Connect terminals 14 and 15 of the smoke detector to 24V.

Option:

- Connect terminals 1 and 4 of the smoke detector to the LightTower.



ATTENTION

Protruding of air sampling tube: max. 30 mm (1.2 in.) (F).

- Install the mounting bracket on the duct with the supplied self-tapping screws. The arrow on the mounting bracket must correspond with the airflow direction through the duct.

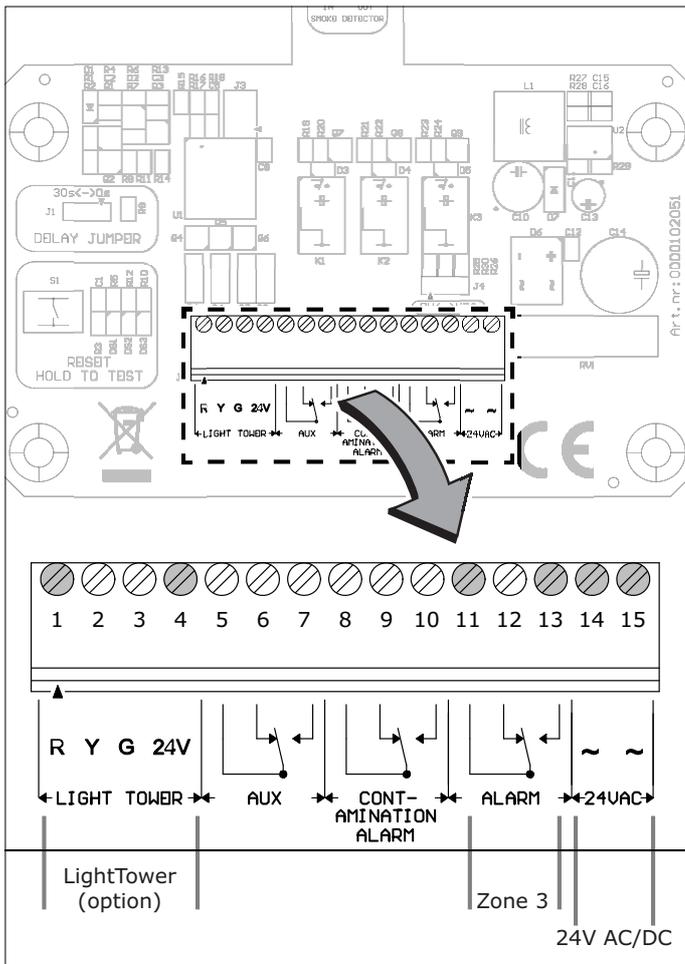


Fig. 9.5

9.4 Functional test

ATTENTION! Notify all parties involved that you will be testing the fire safety system; refer to paragraph 1.4.

To verify its functioning, the smoke detector is fitted with an opening for test spray. To perform the test, proceed as follows.

Fig. 9.6

- **Observe the functional testing instructions as described in paragraph 4.4.**
- Turn off the extraction fan.
- Remove the cap of the test opening (A).
- Insert the test spray's tube into the test opening.
- Release as much test gas as needed to activate the smoke sensor. In this case, the sensor LEDs (B) light up and the ShieldControl panel indicates a fire in Zone 3.

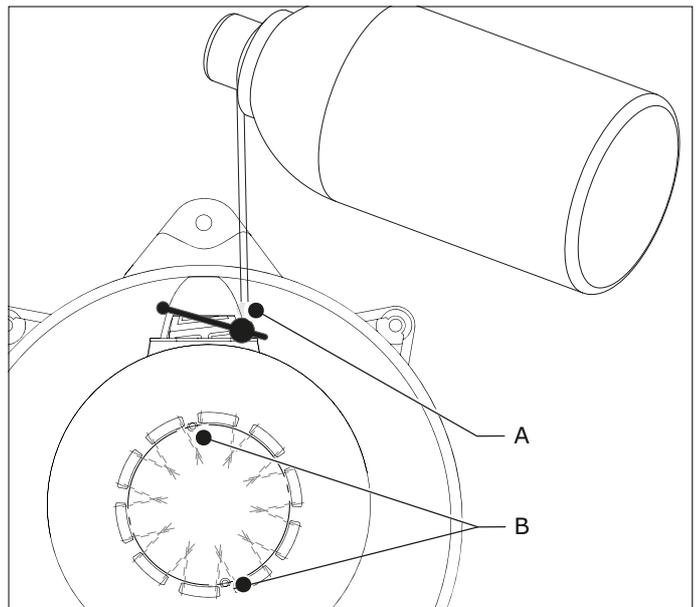


Fig. 9.6

The detector resets automatically once the test gas chamber is free from smoke. The sensor LEDs extinguishes at the same time.

- Place the cap back on the test opening.

9.5 Maintenance

The sensor will become polluted over time. When the sensor is 75% contaminated, it must be replaced. This is indicated by the yellow status LED on the smoke detector and on the LightTower (option).

- During use, check the sensor LEDs and the status LEDs regularly.
- Replace the sensor when the yellow LED flashes.

Smoke detector	Sensor LEDs	Status LEDs / LightTower			Action
		green	yellow	red	
Standby / OK	off	on	off	off	-
Trouble:					
- sensor 75% contaminated	off	on	flash	off	replace sensor
- sensor 100% contaminated	on	off	flash	on	replace sensor
- removed sensor	-	flash	flash	flash	place sensor
ALARM	on	off	off	on	

WARNING Poor maintenance will lead to inadequate sensitivity of the smoke detector.

10 SLIDING VALVES



Scope of supply:

- sliding valve incl. 5/2 solenoid valve, reed contact, junction box and cable gland (3)
- connection flange (2)
- quick release clamp (2)

10.1 Product description and operation

Double activated pneumatic sliding valve with 5/2 solenoid, to be installed by two pieces (before and after filter system). When the filter system is in operation the valves are open. In case of an alarm or power failure or when the fan is switched off the valves are closed. Correct closing of the valves is monitored by the reed contact.

In case of fire, the sliding valves close automatically, operated by pneumatic cylinders. In sequence to a lack of oxygen the fire is supposed to choke. This will also minimize risk of escalation or spreading of smoke.

10.2 Installation

Location:

- 1st sliding valve: in filter inlet duct
- 2nd sliding valve: before or after spark and smoke sensors in filter outlet duct
- to be mounted in vertical position



WARNING

Do **not** mount the sliding valves in horizontal position to avoid malfunction of the valves.

It is strongly recommended that the sliding valves be installed indoors. If they are installed outside, however, ensure that they are protected from rain and snow. Avoid installation where compressed air can cool down below its dew point to prevent damage to the pneumatics.



ATTENTION

Allow sufficient space above the duct for the sliding valves to fully open;

- SV-250: +340 mm
- SV-315: +405 mm
- SV-400: +510 mm
- SV-500: +645 mm
- SV-630: +800 mm
-

The sliding valves can be mounted:

- during installation of a new ductwork
- in an existing duct



WARNING

Ensure that the ductwork can carry the weight of the sliding valves. It is recommended to use duct supports, especially for sliding valves type SV-400/500/630.



ATTENTION

The sliding valves are equipped with eye bolts for lifting purposes during installation. The eye bolts **cannot** be used to mount the sliding valves permanently.

To mount the sliding valves, proceed as follows.

Fig. 10.1

- In case of installation in an existing duct: cut away a piece of the existing duct as indicated in the table below.

Type of sliding valve	Duct length to be removed
SV-250	195 mm +/- 10 mm
SV-315	195 mm +/- 10 mm
SV-400	195 mm +/- 10 mm
SV-500	280 mm +/- 10 mm
SV-630	280 mm +/- 10 mm

- Slide a connection flange (B) into both duct ends (A).
- Place the sliding valve (D) in between and fasten it using the quick release clamps (C).
- Fasten the connection flanges using self-tapping screws.



WARNING

The valves must be mounted straight and without tension on the shell/housing to guarantee airtightness and to avoid noise by airflow.

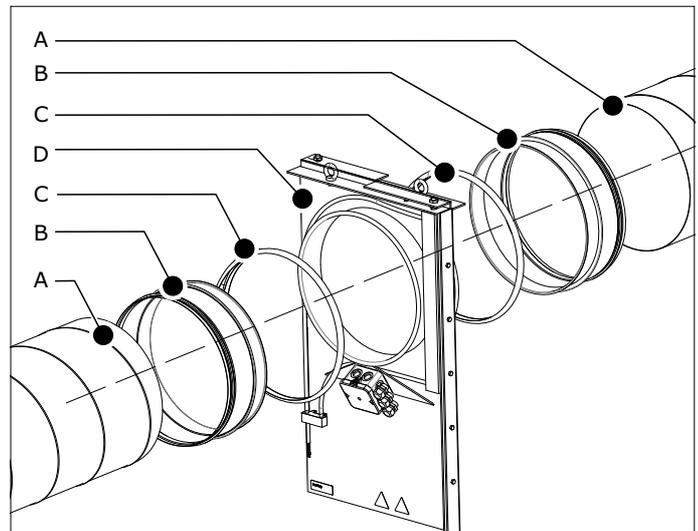


Fig. 10.1



WARNING

If applicable, take precautions to ensure that people are not able to get into the blade's arc of movement.

10.3 Electrical connection

To be sourced locally:

- connection wire: 5 x 0.5 mm² cable

Wiring

- Connect the sliding valves to the system control panel SCP in accordance with the electrical diagram on page 32.
- Connect the reed contacts to the system control panel SCP in accordance with the electrical diagram on page 32.



WARNING

Keep wiring away from places that can become hot due to fire. Do not use filter or duct as support for electrical wires.

10.4 Compressed air connection

Compressed air specifications	
Compressed air connection	6 mm
Recommended operational pressure	5 bar (max. 9 bar)
Quality	dry and oil-free according to ISO 8573-3 class 6

- Connect the sliding valves to a compressed air source.

Setting closing speed of the sliding valves

The closing speed of the valves can be set by the air pressure.

- Set the closing speed of the valves to 4-5 seconds arranged by the air pressure.

Do not set the valves to faster than 4 seconds. If there is a fire alarm, the fan is switched off and the sliding valves are closed. The 4 seconds give the fan enough time to reduce speed and prevents damage to the duct by negative pressure. Do not select speeds slower than 5 seconds either, since the FlameShield modules are activated 5 seconds after the fire alarm.

	WARNING Keep the compressed air feed line away from places that can become hot by fire. Do not use the compressed air supply from the filter because this will be shut off in case of fire. Do not use filter or duct as support for compressed air hoses.
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Post installation checks

- Check electrical connections.
- Check pneumatic connections.
- Check bolts and nuts for correct tightening.

10.5 Functional test

The sliding valves can be tested manually by pushing the test button (A) on the 5/2 solenoid valve.

- Functionally test both sliding valves.

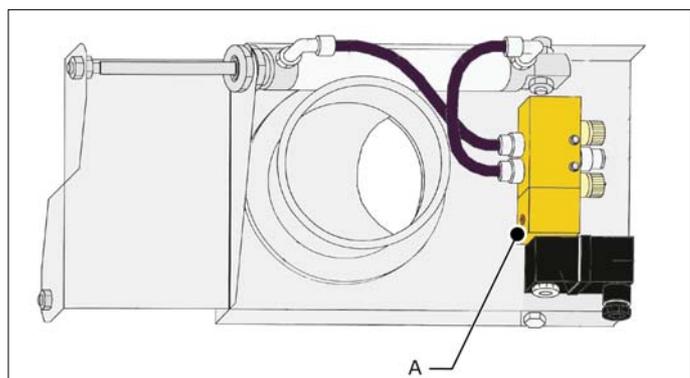


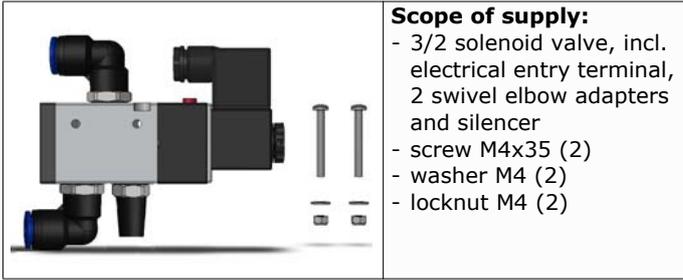
Fig. 10.2

10.6 Maintenance

In order to function properly the sliding valves must be inspected regularly.

Component	Action	Frequency:
		every 6 months
Pneumatics	Check connections.	X
Electrical wiring	Check connections.	X
Bolts and nuts	Check for correct tightening.	X

11 SOLENOID VALVE



Scope of supply:

- 3/2 solenoid valve, incl. electrical entry terminal, 2 swivel elbow adapters and silencer
- screw M4x35 (2)
- washer M4 (2)
- locknut M4 (2)

11.1 Product description and operation

Fig. 11.1

Normally closed 3-way 2-position solenoid valve. When the connected filter system is in operation, the solenoid is activated and compressed air is supplied to the cleaning system of the filter (port P and A are open). If there is a fire alarm or power failure, the solenoid will return to its *normally closed* (NC) position, closing port P and opening port R. In this position compressed air escapes from the filter and it is unable to execute a filter cleaning procedure. This prevents fresh oxygen from reaching the filter in case of fire.

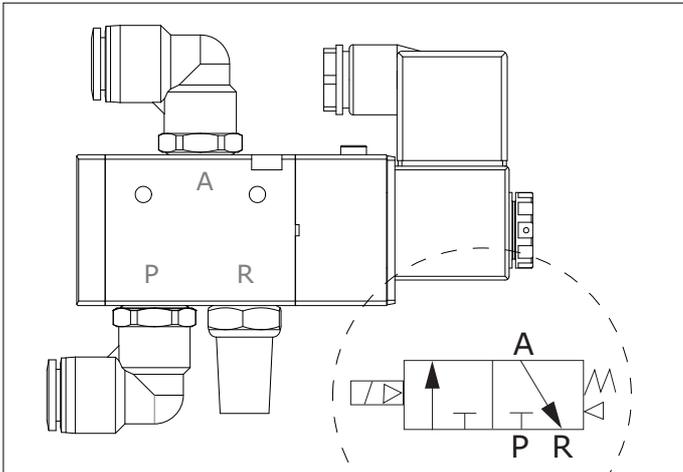


Fig. 11.1

11.2 Installation

Location

The solenoid valve is placed in the main compressed air line between pressure reducer and filter unit. It is recommended to mount the valve on the filter housing.

- Mount the solenoid valve at an appropriate position.

11.3 Electrical connection

To be sourced locally:

- connection wire: 5 x 0.5 mm²

Wiring

- Connect the solenoid valve to the system control panel SCP in accordance with the electrical diagram on page 32.

11.4 Compressed air connection

The solenoid valve is fitted with a 12 mm compressed air tube connection.

- Connect the solenoid valve to compressed air.
- Check compressed air connection of filter system.

11.5 Functional test

The solenoid valve is provided with a button for testing purposes.

- Press button (A) and check that the compressed air escapes from outlet R (B).

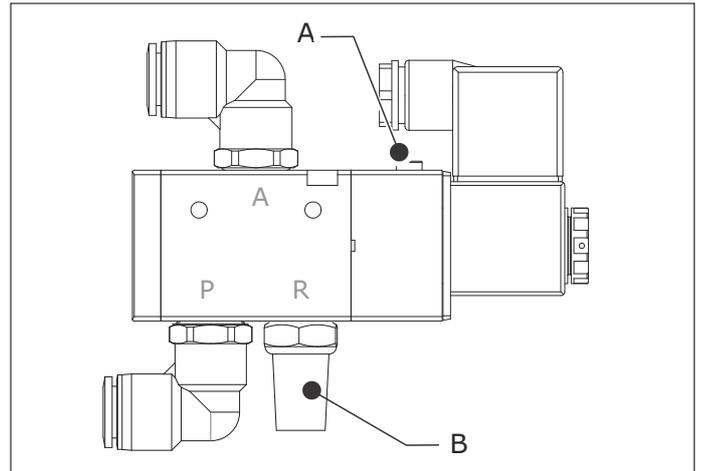
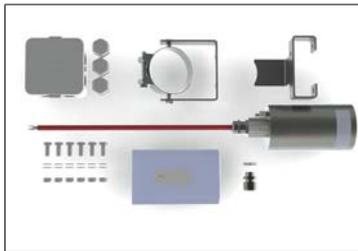


Fig. 11.2

12 FLAMESHIELD



Scope of supply:

- aerosol generator (200 or 500 g)
- mounting bracket (two-piece)
- junction box
- metal cable gland
- plastic cable gland (2)
- mounting material

12.1 Product description and operation

FlameShield¹ is a fire suppression generator designed to be installed directly into the filter system. FlameShield is activated by the ShieldControl fire detection panel 5 seconds after a fire alarm.

The FlameShield is designed to suppress or extinguish filter fires of EN 2 Class A and NFPA 10 Class A (normal or solid combustible material in Plymovent filters).

In 5 to 10 seconds, the filter volume closed by the sliding valves is filled with a potassium aerosol. This material reacts with the free radicals in the flame. The free radicals react with the aerosol instead of the fuel and the chain reaction is stopped immediately. The residue is a negligible amount of harmless and stable potassium hydroxide salt (KOH). This reaction also uses energy from the fire.

After activation the aerosol remains active for at least 30 minutes, which also prevents the fire from starting up again.

12.1.1 Transport and storage

To avoid damage, the following conditions for transport and storage should be adhered to.

- Do not drop.
- Store between -50 and +100°C (-58 and +212°F).
- Relative humidity during transport and storage: max. 98%.

If FlameShield is stored in accordance with the above-mentioned conditions, shelf life of the aerosol generator is 15 years.

12.2 Installation

- Refer to Fig. I on page 31 for the required number, type² and position of FlameShield aerosol generator in MDB filter system.

	WARNING Failure to use the correct number, type and position of the FlameShield generators will prejudice the effective fire response.
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Final installation position of FlameShield must be as follows.

Fig. 12.1

- A Filter cartridge
- B Junction box
- C Framework MDB
- D Mounting bracket FlameShield
- E FlameShield module

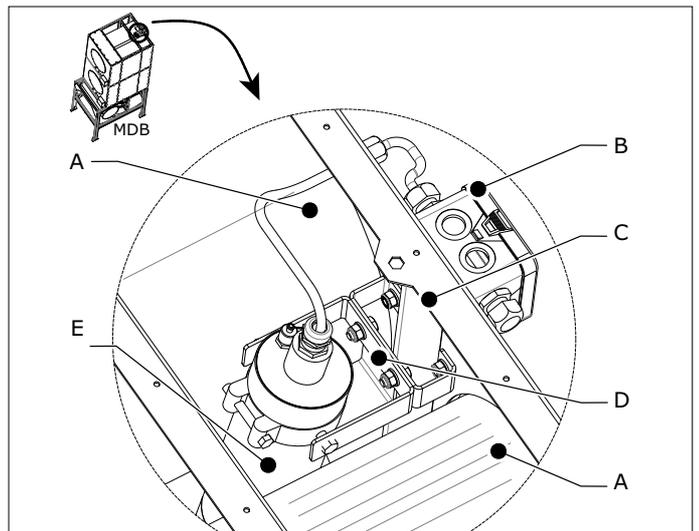


Fig. 12.1

To install the FlameShield module(s), proceed as follows.

Fig. 12.2

- Assemble the mounting bracket (part A + B).
- Drill 2 x 2 holes in the framework of the MDB housing in accordance with the supplied drilling template.
- Mount the junction box (C) along with the mounting bracket using the supplied bolts, washers and nuts.

	Use one of the predrilled holes in the junction box housing to mount it. The box can be mounted using only one mounting point.
--	--------------------------------------------------------------------------------------------------------------------------------

- Place a cable gland (F) in the junction box using one of the knock-out cable entries.
- Guide the cable through the cable gland into the junction box.
- Place the FlameShield module (E) in the bracket. Make sure to push the generator to the middle stop (D) to ensure the correct flow direction of 10°.
- Fasten tightly.

1. FlameShield is the name used by Plymovent for the use of FirePro aerosol generators in Plymovent filter systems. FirePro is a product of Celanova Ltd. Listing and certifications are registered under the name FirePro.

2. Number and type of FlameShield aerosol fire extinguishing generators has been calculated by certified personnel in conformity with BRL-KZ 3003 and NFPA 2010, based on filter class A, E, safety factor 1.3 and min. concentration of 55.29 g/m² effective component.

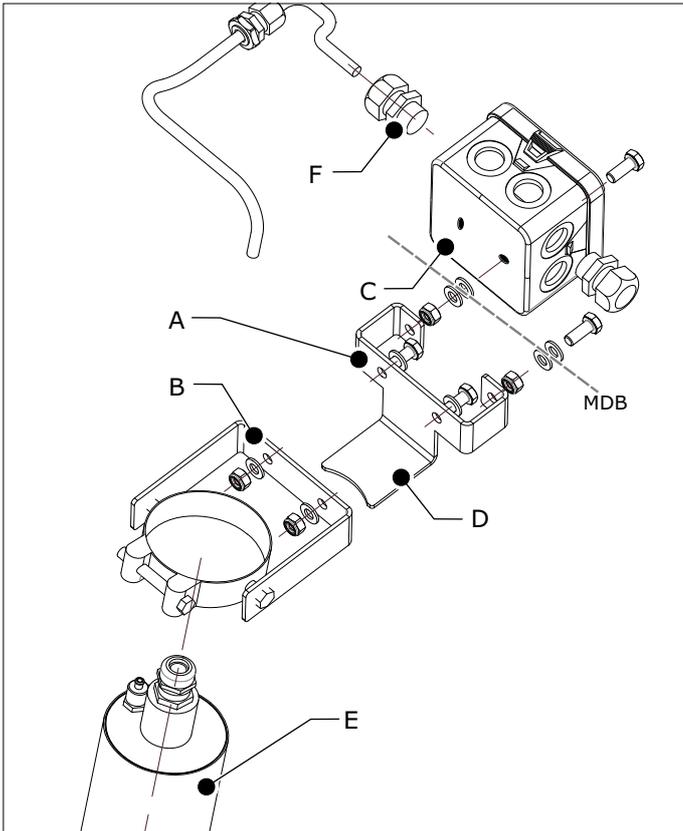


Fig. 12.2

12.3 Electrical connection

To be sourced locally:
- connection wire: 5 x 0.5 mm²

Connection to ShieldControl 6k8

- Connect the junction box to the sequential activator (see sequential activator).
- Place an EOL resistor-diode in the sequential activator (supplied with ShieldControl).
- Connect the sequential activator to the ShieldControl.

12.4 Post installation checks

Before performing the functional test, check the following mounting instructions.

- Wiring from and to the ShieldControl.
- EOL diode in (last) sequential activator.
- Correct position and flow angle (10°) of FlameShield generator.
- Tightening of bolts and nuts.

12.5 Functional test

A functional test can be done in two ways:

- by a simulation
- true functional test

12.5.1 Simulation

Two heat resistant wires are connected to an internal metal spiral activator in the FlameShield generator. The spiral is heated by the current and starts an exothermic chemical reaction that releases the aerosol. The minimum amount of energy needed to start the reaction is supplied by 12V/0.8 A during 3-4 seconds.

The internal wiring of the activator can be inspected by measuring the internal ohm resistance of 2 ohm +/- 0.2 ohm with an ohm meter with a current less than 5 mA. This inspection can be done in the junction box mounted on the outside of the filter by measuring the ohm resistance over the

heat resistant wires.

- Check electrical activation of the FlameShield modules according to the above instruction.

12.5.2 True functional test

A true functional check can be done by replacing the FlameShield module with the detonation simulator supplied and create a fire condition (e.g. by removing one of the spark detectors). After fire alarm the detonation simulator will be activated showing a small flash.



WARNING

Use Personal Protective Equipment (PPE) to protect from exposure to sparks.

- Perform a true functional test as described above.
- Reset activated detector (refer to relevant chapter).
- Press the **RESET** button on the ShieldControl panel.
- Reconnect the FlameShield module(s).



WARNING

Keep away from inflammable material and do not hold in the hand.

12.6 Maintenance

During the lifespan of FlameShield, the generators must be inspected periodically in accordance with the national fire protection association requirements or the authorities having local jurisdiction.

Component	Action	Frequency:	
		at least every 12 months	every 10 years
Metal holder	Check for damage, corrosion and correct position.	X	
Support bracket	Check for damage, corrosion and correct position.	X	
System wiring connections and circuit	Check proper wiring and circuit.	X	
FlameShield internal activation	Check internal activation; ref. paragraph 12.5.	X	
Aerosol generator	REPLACE.		X



WARNING

When the filter installation with FlameShield generators is placed in an area where it is exposed to vibrations due to e.g. heavy machinery, more frequent inspections are needed to secure correct positioning.



Put a sticker on the FlameShield generator(s) stating the installation date and/or keep a log.

Due to their chemical composition and characteristics, the FlameShield generators do not require any inspection and maintenance during their lifespan.

13 FUNCTIONAL TEST AND COMMISSIONING



ATTENTION!

Notify all parties involved that you will be testing the fire safety system; refer to paragraph 1.4.

To avoid accidental fire alarms and activation of the FlameShield fire extinguishing generators always follow the following sequence for installation, commissioning and maintenance.



WARNING

Ensure that all functional tests are performed in accordance with the national fire protection association requirements or the authorities having local jurisdiction.

1. Before starting, de-energize the ShieldControl panel and isolate the FlameShield modules.
2. Make all connections to the ShieldControl panel, with exception of the FlameShield modules.
3. Make all connections to the system control panel SCP.
4. Create a temporary bridge to the terminal(s) for the FlameShield with the EOL diode to avoid fault alarm.
5. Apply power to the panel. When all connections are correct, only the green **POWER ON** and either the **AUTO & MANUAL** or **MANUAL ONLY** indicators will be lit.
6. Switch to **AUTO & MANUAL** mode.
7. Test the detectors and system control panel SCP as instructed to make sure that the system is reacting as expected and required.
8. Reset the panel, detectors and system control panel SCP and make sure no fault indicators will be lit. If any fault indicator is lit the appropriate input or output must be checked and cleared before proceeding. Make sure all detectors are reset.
9. After satisfactory testing, switch to **MANUAL ONLY** mode. Make all final connections to the sequential activator(s) and FlameShield generator(s) and verify the circuit (no fault on **EXTING. FAULT** line). Refer to paragraph 13.1.
10. Switch back to **AUTO & MANUAL** mode. When all connections are correct, only the green **POWER ON** and **AUTO & MANUAL** indicators will be lit. In this mode FlameShield will be activated by automatic detection or manual call point.

13.1 Adjustment circuit resistance FlameShield

After having performed the functional test successfully, the circuit sensitivity of the FlameShield modules should be adjusted.

The monitoring resistor value of the extinguishing circuit must be adjusted to the number of sequential activators, FlameShield generators and cable length once the sequential activators and generators have been fitted. This is done by a variable resistor.

To adjust the monitoring resistor value proceed as follows.

- Open the ShieldControl panel.
- Adjust the variable resistor (**EXTING. MON.**) in such a way, that when all connections are made the **EXTING. FAULT LED** is lit.
- Adjust the variable resistor to the point where this LED is switched off.
- Subsequently turn it a quarter of a turn ($\frac{1}{4}$) clockwise.

A correct setting can be tested as follows.

- Make a short circuit of the extinguishing output cable.
- **EXTING. FAULT LED** should lit.
- Remove short circuit. **EXTING. FAULT LED** should go out.



WARNING

The circuit resistance should not be too sensitive as this may produce erroneous fault conditions under some conditions, such as extreme temperature or battery voltage fluctuations.

14 COMMISSIONING CHECKLIST

14.1 ShieldControl

#	Check	OK
1.	Is the ShieldControl panel connected to a clean electrical group or a group not subject to regular power failures by other equipment?	
2.	Is the panel placed in an environment without excessive dust in line with IP 30 or otherwise placed in a cabinet?	
3.	Is the integrated manual call point provided with a breaking seal to monitor inappropriate use?	
4.	Are all cables checked for correct connection in accordance with the electrical diagram?	
5.	Are the EOL resistors removed from the terminals that are in use and placed in the connected equipment?	
6.	Are the cables well guided and fixed?	
7.	Is a shielded cable being used for all detectors as well as the manual call point?	
8.	Is the ShieldControl 6k8 switched to AUTO & MANUAL mode?	
9.	No fault signals on the ShieldControl panels?	

14.2 Heat detector set(s)

#	Check	OK
1.	Are the heat detectors placed on top inside the filter housing and in the hopper just above the dustbin?	
2.	Number of heat detector sets = number of hoppers?	
3.	Are the heat detectors wired in parallel and connected to Zone 2 of ShieldControl?	
4.	Is an EOL resistor of 6k8 placed in the last heat detector?	
5.	Is each heat detector provided with an alarm resistor (RAL) of 470 ohm placed in series in the switching circuit?	
6.	Is each heat detector being functionally tested by gently heating it with a heat gun or heat lamp and alarm signal being monitored by ShieldControl?	

14.3 Spark detector set

#	Check	OK
1.	Are the spark detectors placed face to face in the filter outlet duct?	
2.	Ensure that the spark detector is not mounted on the bottom of the duct.	
3.	Are the spark detectors shielded against any light and holes sealed with metal foil? Do not use duct tape since this may let through infrared light.	
4.	Are the spark detectors wired in parallel and connected to Zone 1 of ShieldControl?	
5.	Is the last spark detector in the circuit provided with REOL of 6k8 in line with ShieldControl 6k8?	
6.	Is the earth connection properly made?	
7.	Are the lenses clean?	

#	Check	OK
8.	Are the spark detectors being functionally tested through exposure to daylight and the signal being monitored by ShieldControl?	

14.4 Smoke detector

#	Check	OK
1.	Is the smoke detector placed in the filter outlet duct?	
2.	Is the mounting bracket correctly installed in relation to the airflow?	
3.	Is the smoke detector connected to Zone 3 of ShieldControl?	
4.	Is the smoke detector being functionally tested by test spray? Is the signal being monitored by ShieldControl?	

14.5 Manual call point and fire alarm sounder

#	Check	OK
1.	Are the manual call points marked or placed close to the ShieldControl panel in order to avoid confusion with the general manual alarm boxes of the building?	
2.	Is the REOL that was placed in the manual call point in line with the ShieldControl 6k8?	
3.	Is the manual call point connected to the terminal with 470 ohm RAL?	
4.	Are the fire alarm sounders placed close to the ShieldControl panel and fitted with the correct EOL resistor 10k?	
5.	Is the sounder set to your local tone?	
6.	Is sound level set to the maximum?	
7.	Is the manual call point being functionally tested and monitored by the ShieldControl?	
8.	Is the fire alarm sounder being tested and activated by ShieldControl?	

14.6 Sliding valves

#	Check	OK
1.	Can the ductwork carry the weight of the sliding valves? If not, make sure the duct is properly supported.	
2.	Are the sliding valves mounted straight and tension-free in the duct? Tension on the housing results in inadequate sealing and noise by airflow.	
3.	Are the sliding valves pneumatically and electrically wired?	
4.	Are the reed contacts of the sliding valves connected to the system control panel SCP?	
5.	Are sliding valves mounted indoors? If not, are they adequately protected against precipitation, such as rain and snow?	
6.	Is the compressed air pressure for the sliding valves 4-5 bar and the compressed air dry and oil-free?	
7.	Do the sliding valves close in 4-5 seconds? If not, reduce or increase pressure.	
8.	Are the pneumatic and electrical wiring guided away from potential fire places like duct and filter?	

#	Check	OK
9.	Make sure that the compressed air feed of the sliding valves is an independent line and not via the compressed air for the cleaning of the filter.	
10.	Are the sliding valves functionally tested after a fire test alarm in the complete system set up?	
11.	Do the sliding valves close when filter system is shut down and open at filter start up?	

14.7 Solenoid valve

#	Check	OK
1.	Is the 3/2 solenoid valve mounted between compressed air reducer (CAR kit) and filter?	
2.	Is the solenoid electrically and pneumatically correctly wired? When the solenoid is disconnected from power, the air of the compressed air tanks of the filter system should be released.	
3.	Is the solenoid functionally tested after a fire test alarm in the complete system set up?	

14.8 FlameShield

#	Check	OK
1.	Are FlameShield modules undamaged?	
2.	Is the correct number of FlameShield modules being installed?	
3.	Are the FlameShield modules placed at the correct position?	
4.	Are the FlameShield modules pushed back to the middle stop of the mounting bracket to secure a 10° downwards release angle?	
5.	Are all nuts and bolts well tightened?	
6.	Are the cables tension free, well guided and fixed by the cable glands?	
7.	Are the cable glands well tightened?	
8.	Is the internal wiring/electrical activation checked by measuring resistance over the internal heating device of the FlameShield with a current less than 5 mA? The resistance must be 2 ohm.	
9.	Is, in combination with ShieldControl 6k8, the EOL diode placed in the last sequential activator and the sequential activator connected to the exting terminal?	
10.	Is, for ShieldControl 6k8, the monitoring resistor value of the extinguishing circuit adjusted?	

14.9 System control panel SCP

#	Check	OK
1.	Is the system control panel SCP correctly connected to the ShieldControl panel and peripheral equipment?	
2.	Is the system control panel SCP functionally tested on a test alarm and performed expected actions (fan stops, sliding valves close, 3/2 solenoid opens)?	

14.10 Final

#	Check	OK
1.	After all functional testing, reset all detectors and panels. When no alarm signals are visible, connect the FlameShield modules. Make sure that ShieldControl is in AUTO & MANUAL mode.	

15 MAINTENANCE

The entire system including the ShieldControl panel must be tested periodically in accordance with the national fire protection association requirements or the authorities having local jurisdiction.

The indicated maintenance intervals can vary depending on the specific working and ambient conditions. Therefore it is recommended to perform the first general maintenance check three months after commissioning and determine the future frequency based on the state of the system after this period. In any case the complete system must be checked at least once a year.

- Refer to the separate system components about method and frequency of maintenance. Maintenance activities have been summarized in the maintenance calendar below.

15.1 Maintenance calendar

The maintenance activities in the table below indicated by [*] can be carried out by the user; other activities are strictly reserved for well trained and authorized service personnel.

Frequency	Component	*	Ref.	
			par.	page
Regularly, depending on intensity of use	Heat detectors	*	7.5	11
	Spark detectors	*	8.5	13
	Smoke detector	*	9.5	16
Whenever dirty	ShieldControl panel	*	5.5	8
Every 6 months	Sliding valves		10.6	18
At least every 12 months	FlameShield		12.6	21
Every year	ShieldControl panel		5.5	8
Every 4 years	ShieldControl panel		5.5	8
Every 10 years	FlameShield		12.6	21

16 POST-FIRE PROCEDURE

The post-fire procedure is strictly reserved to skilled and authorised service engineers.

- Carry out the post-fire procedure as written in paragraph 19.2 on page 28.

17 ELECTRICAL DIAGRAM

Refer to electrical diagram on page 32.

18 OPERATION

18.1 ShieldControl fire detection panel



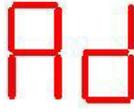
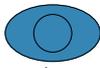
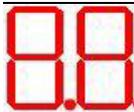
18.1.1 Keys

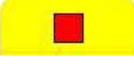
The ShieldControl panel comes with 3 sets of 2 keys:

- key to switch between **AUTO & MANUAL** and **MANUAL ONLY**
- key **ENABLE CONTROL** to lock and enable control of blue buttons
- key to open and lock panel itself

To avoid improper use, the keys should be stored securely during normal operation of the system.

18.1.2 Main controls

How to:	Do this:	Display:	Comments:
Silence alarms	SILENCE SOUND ALARM  Press button	 Alarm/Fault Buzzer Silenced	Temporary silence; can be used without ENABLE CONTROL key
Silence buzzer	ALARM/FAULT WARNING SILENCE  Press button	 Alarm/Fault Warning Silenced	Temporary silence; can be used without ENABLE CONTROL key
Enable remaining buttons	ENABLE CONTROL  Insert key and turn right		Buzzer beeps twice every 7 seconds
Reset	RESET  Press button	All fault indicators flash for 3 seconds	Resets fire detection system. Fire suppression system will reset only after the aerosol extinguishant has been released.
Test lamps	LAMP TEST  Press button	 All lamps on.	Buzzer sounds whilst button is pressed

How to:	Do this:	Display:	Comments:
Change from MANUAL ONLY to AUTO & MANUAL and vice versa.	 Insert key and turn		
Manually release the extinguishant	 Pull down flap and press button to release extinguishant.		Extinguishant will release after time displayed in seconds on the countdown timer.

Refer to the user manual supplied with the ShieldControl panel for more extensive control instructions.

18.2 Manual call point

The ShieldControl panel is provided with an integrated manual call point. One or more separate manual call points (option) can be used in addition to or instead of the integrated one.

When a fire is detected, the fire detection and suppression system can be activated manually through one of these manual call points.

18.2.1 Integrated manual call point

The integrated manual call point indicated by **EXTINGUISHANT RELEASE** has a security seal to avoid improper use.

To activate the integrated manual call point, proceed as follows.

Fig. 18.2

- Pull down the yellow flap (A) and push the red button (B).

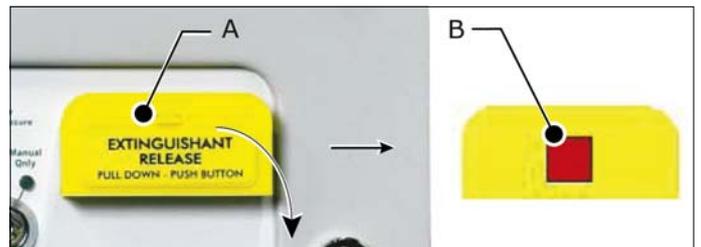


Fig. 18.2

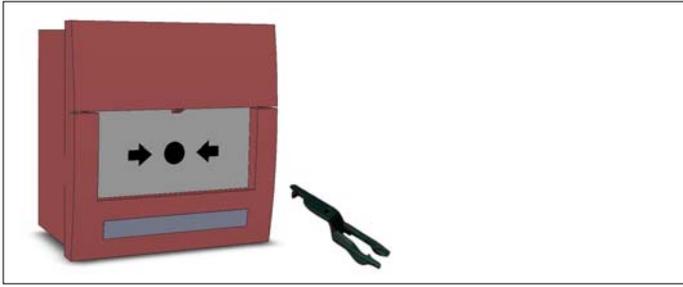
Reset procedure

To reset the integrated manual call point, proceed as follows.

- Place a new security seal.
- Press the **RESET** button on the ShieldControl panel.

18.2.2 Separate manual call point (option)

The separate manual call point comes with a reset key.



To activate the separate manual call point, proceed as follows.

- Push the black button.

Reset procedure

To reset the manual call point, proceed as follows.

Fig. 18.3

- Place reset key (A) in opening at the bottom of manual call point.
- Pull sliding part downwards and push back. The yellow marking will disappear.

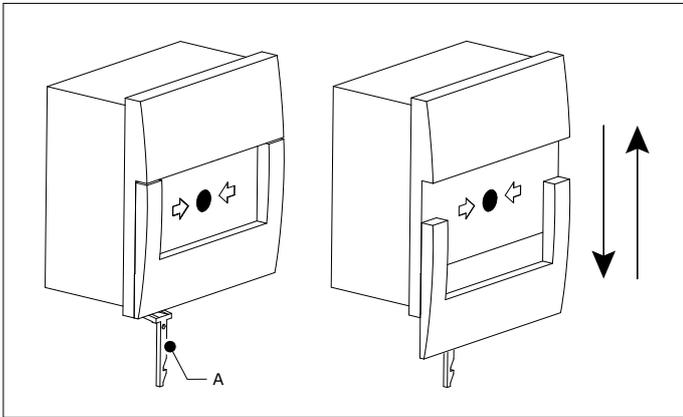


Fig. 18.3

 Store the reset key separately from the manual call point to prevent improper use.

19 FIRE ACTION PROCEDURE



WARNING!

Always comply with the legal fire safety procedures and respect instructions from the fire safety coordinator.

19.1 In case of fire

When a fire is detected, the system can be activated manually through the manual call point (refer to paragraph 18.2). Automatic detection of fire is triggered by heat, sparks or smoke.

In the event of a fire, the system reacts as follows.

Fig. 19.4

1. FIRE alarm (A) and FIRE IN ZONE (B) indicators light up, RELEASE IMMINENT (C) indicator lights up and SYSTEM MODE (D) display shows countdown.
2. Panel buzzer and fire alarm sounder are activated.
3. System control panel stops fan, closes sliding valves and releases compressed air through 3/2 solenoid valve.
4. Five seconds after fire alarm, the FlameShield fire extinguishing generator(s) is/are activated.
5. SYSTEM MODE (D) display shows EEE.

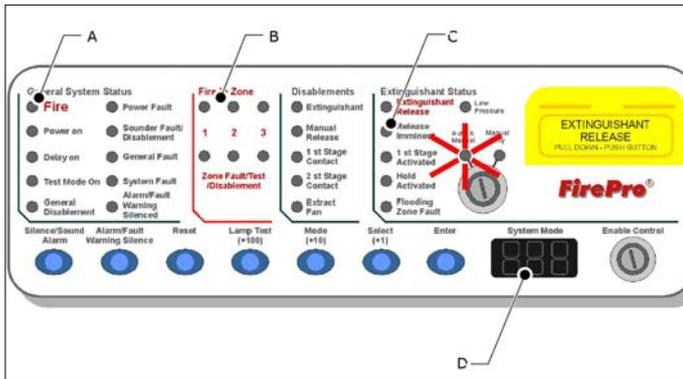


Fig. 19.4



ATTENTION!

The FlameShield extinguishing material is extremely fine. In case of fire, it may seem like smoke escapes through the seams of the filter system, but most probably it concerns the extinguishing material which is fully harmless to environment and human.

19.2 Post-fire procedure

- Silence fire alarm sounder. Refer to paragraph 18.1.2.

19.2.1 MDB + FlameShield

After any fire incident, the entire installation must be inspected and released by a skilled and authorized service engineer.



WARNING!

To avoid re-ignition of the fire and to prevent consequential damage, keep filter closed for at least 15 minutes.



WARNING!

During inspection and maintenance, always use Personal Protective Equipment (PPE) to avoid injury. This also applies for persons who enter the work area.



ATTENTION!

Do **not** start maintenance before receiving permission from authorized personnel.

The following activities are strictly reserved to skilled

and authorised service engineers.

- Inspect the filter and hopper for glowing materials before starting maintenance.
- Inspect the MDB filter cartridges and replace in case of doubt, when they are damaged by fire or any cartridge at less than 50 cm (20 in.) proximity of the aerosol release opening of the FlameShield generator.
- Follow maintenance procedure on spark detectors (ref. paragraph 8.5).
- Follow maintenance procedure on smoke detector (ref. paragraph 9.5).



CAUTION!

The FlameShield modules get hot from the release of the aerosol. Allow the modules to cool down before replacement or use protective gloves.

- Disconnect the ShieldControl panel.
- Replace the FlameShield module(s).
- Perform the post installation checks of all separate components as described in the relevant paragraphs.
- Go through the commissioning checklist as described in chapter 13.
- The used FlameShield modules can be disposed of as non-hazardous waste.

19.2.2 Manual call point

- Reset manual call point. Refer to paragraph 18.2.2.

19.3 Release

Release of the system after fire is strictly reserved to skilled and authorized personnel.

20 MAINTENANCE

Periodic maintenance

The system has been designed to function without problems for a long time with a minimum of maintenance. In order to guarantee this, some simple, regular maintenance, testing and cleaning activities are required. If you observe the necessary caution and carry out the maintenance at regular intervals, any problems occurring will be detected and corrected before they lead to a total breakdown.

The entire system including the ShieldControl panel must be tested periodically in accordance with the national fire protection association requirements or the authorities having local jurisdiction.

Method and frequency of maintenance are described under the separate components in the installation section.

20.1 Maintenance calendar

Maintenance activities must be carried out in accordance with the table below.

The maintenance activities in the table below indicated by [*] can be carried out by the user; other activities are strictly reserved for well trained and authorized service personnel.

Frequency	Component	*	Ref.	
			par.	page
Regularly, depending on intensity of use	Heat detectors	*	7.5	11
	Spark detectors	*	8.5	13
	Smoke detector ¹	*	9.5	16
Whenever dirty	ShieldControl panel	*	5.5	8
Every 6 months	Sliding valves		10.6	18
At least every 12 months	FlameShield		12.6	21
Every year	ShieldControl panel		5.5	8
Every 4 years	ShieldControl panel		5.5	8
Every 10 years	FlameShield		12.6	21

1. Make sure to have a replacement sensor in stock.

The indicated maintenance intervals can vary depending on the specific working and ambient conditions. Therefore it is recommended to thoroughly inspect the complete system once every year beside the indicated periodic maintenance. For this purpose contact your supplier.

21 SPARE PARTS

The following spare parts and consumables are available for the system.

Art. no.	Description
ShieldControl 6k8	
9880070010	Replacement batteries 12V for ShieldControl 6k8
9880070020	Manual call point
0019030600	Fire alarm sounder
9880070040	Sequential activator
0019020100	Electrical activator unit
Manual call point	
<i>on request</i>	Reset key for manual call point 6k8
Smoke detector	
0000103161	Replacement smoke detector
9880070050	Smoke detector test spray (250 ml)
Spark detector	
9880070060	Replacement spark detector (without end of line resistor)
9880070080	Replacement spark detector with 6k8 ohm end of line resistor (REOL)
Sliding valves	
0690030010	Quick release clamp Ø 250 mm
0690030020	Quick release clamp Ø 315 mm
0690030030	Quick release clamp Ø 400 mm
0690030040	Quick release clamp Ø 500 mm
0690030050	Quick release clamp Ø 630 mm
0332000300	Magnetic reed switch
0000101521	5/2 solenoid valve
0000101522	Pneumatic cylinder SV-250
0000101523	Pneumatic cylinder SV-315
0000101524	Pneumatic cylinder SV-400
0000101525	Pneumatic cylinder SV-500
0000101526	Pneumatic cylinder SV-630
FlameShield	
7900027030	Replacement module for FlameShield-200
7900027040	Replacement module for FlameShield-500

22 DISPOSAL

After the life of the products, dispose them of in accordance with federal, state or local regulations.

22.1 FlameShield

After the life of the product, dispose it of in accordance with federal, state or local regulations;

- activated FlameShield generators can be disposed of as non-hazardous waste
- non-activated FlameShield generators at end of lifespan must be returned to the supplier

CE DECLARATION

An installation like *SHIELD fire safety solutions* is defined as a combination of several finished products or components that are assembled by an installer at a given place. The various parts of the installation are intended to operate together in a particular environment and to perform a specific task.

The entire installation must comply with the relevant directives and standards. The assembly instructions given by the manufacturer, as well as the whole method of installation, must be in accordance with good engineering practices within the context of installations, as well as installation rules.

Considering the above, the installer will be responsible for completing the installation and issuing the final CE Declaration of Conformity.

Number and type of FlameShield aerosol fire extinguishing generators per MDB filter unit

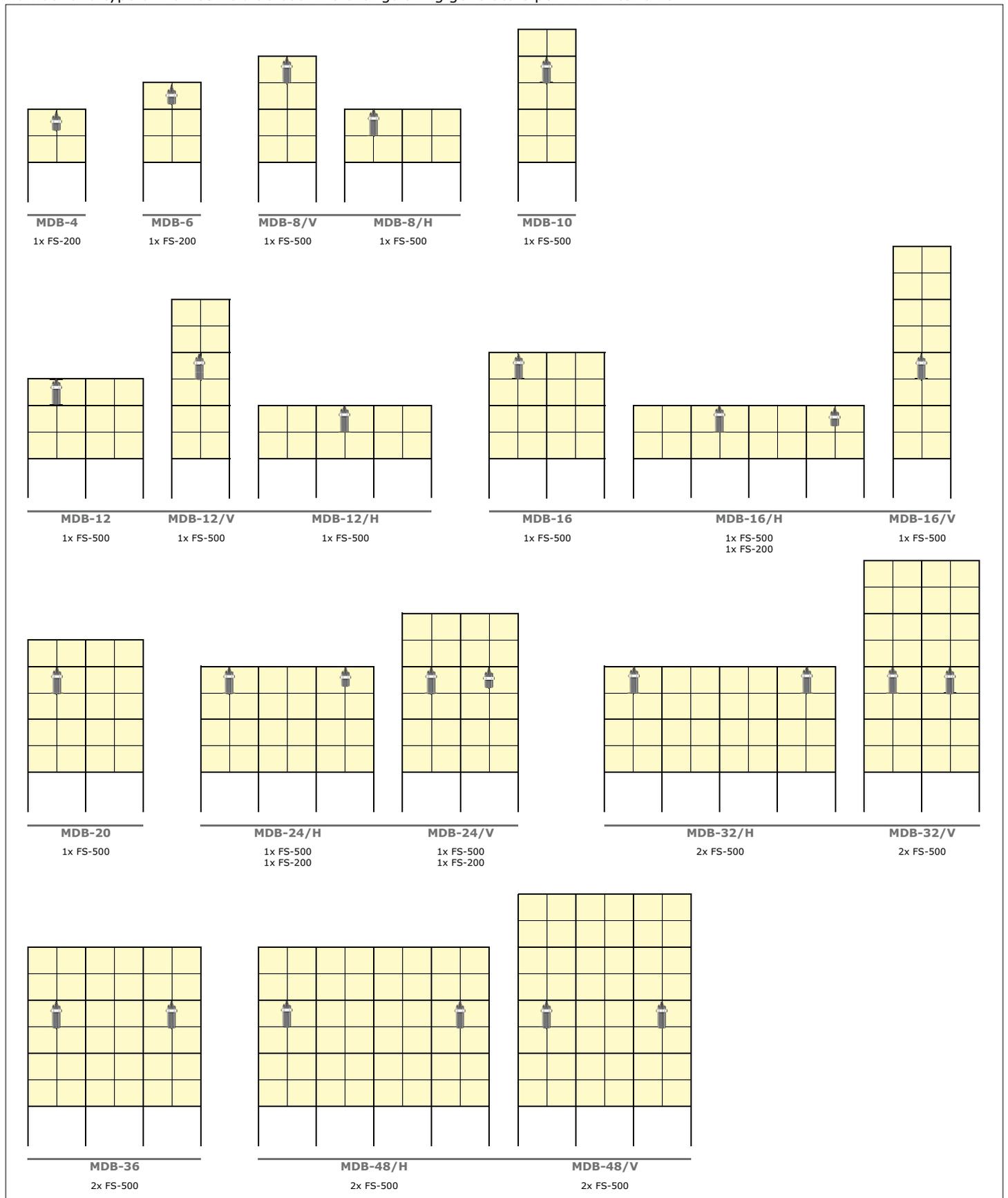
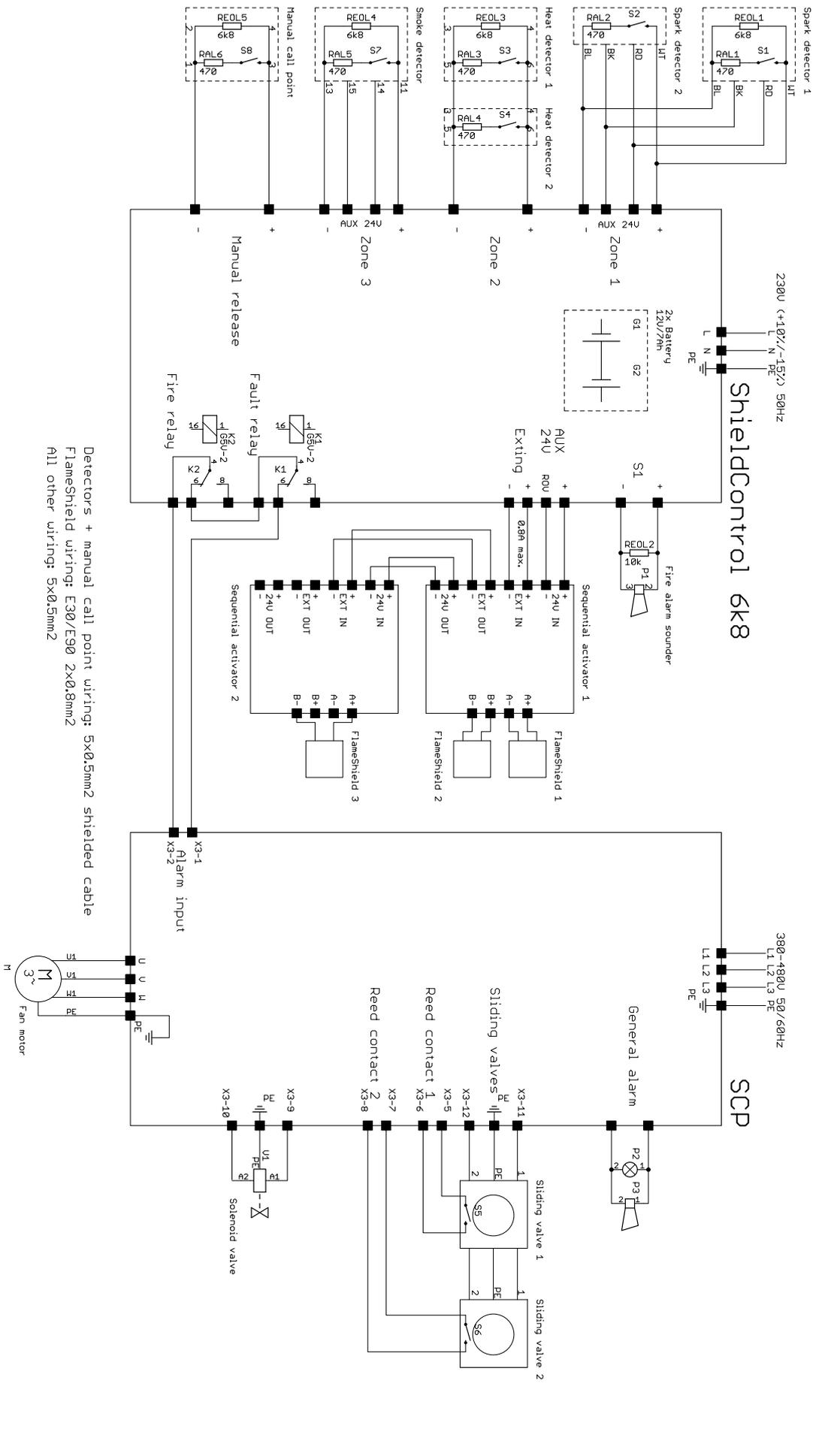


Fig. I

Electrical diagram



Detectors + manual call point wiring: 5x0.5mm2 shielded cable
 FlameShield wiring: E30/E90 2x0.8mm2
 All other wiring: 5x0.5mm2

- Alarm sequence:
- 1) Fire alarm sounder, shut down motor, close sliding valves, close solenoid valve
 - 2) Delay 5 seconds: release extinguishing agent (FlameShield) during 60 seconds

TITLE: Electrical diagram ShieldControl 6k8 Rev C	
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