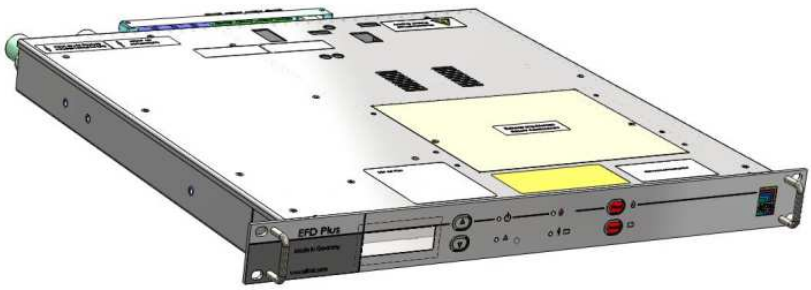

EFD Plus
Early fire detection

7338.220

Assembly and operating instructions **EN V.2.0**

FRIEDHELM LOH GROUP

EFD Plus
Smoke Aspirating System

General information

The Smoke Aspirating System EFD Plus is a quality product in accordance with the latest state of the technical art.

As the sole supplier in Europe for mobile and stationary fire protection solutions from a single source Minimax offers individual protection concepts for every risk. More than 100 years of experience, intensive contributions to national and international expert committees, and the close co-operation with insurers and test institutes form the basis of the high quality and safety of problem solutions for fire protection from Minimax.

The successful implementation of the installation and the safe operation of this device requires knowledge found in these operating instructions.

The information is presented concisely and clear.

Device manufacturer:
Minimax GmbH & Co. KG
Industriestraße 10/12
23840 Bad Oldesloe
Germany
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Fax: +49 (0)4531/803 - 248
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Internet: www.minimax.de

EFD Plus
Smoke Aspirating System

Contents

1. General

1.1 Explanation of symbols and notices

In this documentation safety notices and important explanations are indicated by the following symbols:

Caution!

Is placed before warnings which require particular observation to ensure the proper operation of the system, the compliance with directives, regulations, notices and correct procedures, and the prevention of personal injury, malfunctions, faults or damage to the device or the whole system.

Note

Indicates general notes and explanations.

1.2 Intended use

This device is only to be used in accordance with the operating conditions detailed in the contract documentation and the operating manual.

Any other or additional use is not as intended. The manufacturer is not liable for any damage resulting from such use, the risk in such cases is born exclusively by the operator or commissioner.

The intended use also includes:

- observing all notices contained in the operating instructions
- complying with the operating, servicing and maintenance conditions prescribed by Minimax.

The operator must carry out regular visual and functional inspections in accordance with the check list in the chapter maintenance / service and must document them in the report book, if necessary.

The operator must coordinate modifications of the object to be protected with the installer or commissioner of the system if they affect the function of the EFD Plus Smoke Aspirating System (e.g. additional holes in the cabinet to be protected).

These operating instructions

- relate to the EFD Plus Smoke Aspirating System and are intended to serve as working documentation for the operators and users of this device. However, they cannot replace the training / instruction in the EFD Plus Smoke Aspirating System.
- do not replace applicable laws, standards, regulations and technical guidelines in any way.
  The observance of such requirements is the responsibility of the installer or operator of the system.
- do not claim to be complete and are subject to continuous updates without prior notice.
- are aimed exclusively at specially trained experts familiar with the corresponding specialist knowledge relating to the installation, commissioning, maintenance and modification of technical devices of this kind.

1.3 Safe operation

The device described here has been manufactured in accordance with the latest state of the technical art and accepted safety rules and features a high degree of operational safety.

However, the device can pose hazards or impair the system or other property if used improperly or other than intended.
The device must only be used in an undamaged and fully functional condition.
The notices on the installation, operation and maintenance of this device contained in these operating instructions aim at the proper, safe and error-free operation. Since relevant regulations may differ across the world, the applicable national regulations and laws at the location of use must be observed even if they contradict the notices contained in these operating instructions. The following details must in particular be observed:

- National safety and accident prevention regulations
- National standards and laws, particularly with regard to hazard detection systems
- National assembly and installation regulations
- Generally accepted technical principles
- These operating instructions including the safety and warning notices contained therein
- The characteristics and technical specifications of this device

Where it is suspected that a safe operation is no longer possible (e.g. damage) the device must be immediately decommissioned and protected against unintentional re-commissioning.

1.4 Operator's obligation

The operator commits to only allows individuals to work at/with the EFD Plus Smoke Aspirating System,

- who are familiar with the basic regulations on occupational safety and accident prevention,
- who have been instructed in the handling of this device and the overall system, and
- who have read and understood the operating instructions including the safety and warning notices contained therein.

1.5 User's obligation

Installation, maintenance, inspections and repairs may only be carried out by individuals with adequate professional qualifications. These individuals are, for example, “competent individuals in matters relating to hazard detection systems” or “qualified electricians for hazard detection systems”. The applicable national regulations, in particular with regard to the required qualifications, in the country of use must be observed.

Furthermore, all individuals working with the device commit

- to always observe the basic regulations on occupational safety and accident prevention,
- to familiarise themselves prior to starting work with the conditions of the object and its environment, the safety concept, the protection task and possibly the monitoring task of an superordinated fire detection system,
- to have read and understood the operating instructions including its safety and warning notices.

Any questions with regard to the operating instructions must immediately be clarified with the respective supervisor or the manufacturer of the device.

1.6 Alterations and modifications

Unauthorised alterations and modifications of the device are not permitted and invalidate any manufacturer liability.

1.7 Documentation of additional system components

If the device is used in conjunction with other components from Minimax (or other manufacturers), it must be ensured prior to commissioning the system that the relevant manufacturer documentation has been read and understood.

1.8 Spare parts

Only original spare parts may be used.

1.9 Technical developments

The manufacturer reserves the right to modifications in the interest of technical development whilst retaining the key features of the device type described without corrections to these operating instructions.

2. Function and design of the EFD Plus Smoke Aspirating System

2.1 Short description

The EFD Plus Smoke Aspirating System has been designed for installation in enclosed switch cabinets and is a compact unit that is able to detect a fire in its early stage.
Fire detection takes place via sensors to be adjusted for the anticipated fire characteristics (automatic fire detectors).
A EFD Plus Smoke Aspirating System can monitor up to 5 cabinets at the same time.

Alarms and faults can be transmitted via potential-free contacts or optionally via the CMC-TC with I/O unit to a superordinated location (monitoring or control device).

The compact smoke aspirating system with a space requirement of only 1 unit can be installed in any free slot of a 19" switch cabinet system. The device is easy to install and cheap to maintain.

The EFD Plus smoke aspirating system is prepared for the combined operation with the extinguishing system DET-AC Plus Slave. Up to 5 DET-AC Plus Slave can be attached to the device.

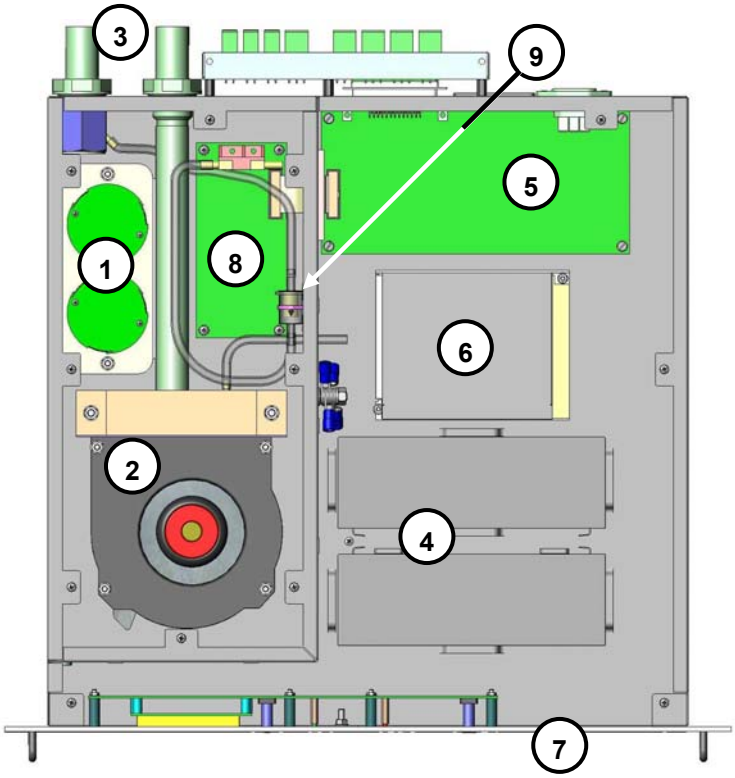
Areas of application

The EFD Plus Smoke Aspirating System is used to protect high quality technical installations whose high availability is a must.
These include:

- **IT, server and network technology**
  which must provide important data for the enterprise process and ensure the data flow itself
- **Production controls**
  whose technology ensures the uninterrupted running of the manufacturing processes
- **Telecommunications installations**
  which ensure that the communication of the enterprise works without interruptions
- **Power supply and control systems**
  which ensure sufficient energy at the right time at the right place in the enterprise

The earliest detection of a fire together with potential extinguishing action ensures that downtimes and subsequent damage caused by a technical fault are minimised.

2.2 Design



1) Fire sensors
2) Aspiration fan
3) Aspiration and exhaust air connections
4) Emergency power supply (accumulators)
5) Main board
6) Power supply unit
7) Front panel with display and control panel
8) Detector interface
9) Filter for air flow monitoring

2.3 Function

Via a pipe system(3) a fan (2) constantly sucks air samples from the area to be monitored and passes them via the fire sensors (1) for continous monitoring.

The sensors are monitored permanently by the evaluation and control electronics (5) on the control card for functionality and potential soiling.

When the first fire alarm criterion is reached, the evaluation electronics controls the process programmed for this event: It displays the alarm condition on a display (7), if necessary triggers the transmission to superordinated systems, controls optional acoustic and optical alarm devices.

When the second alarm criterion is reached the relay “extinguishing” is triggered electrically after a preset analysis time. Additionally a connected fire extinguishing system DET-AC Plus Slave can be actuated via the CAN-bus connection.

The extinguishing agent tank is protected against overpressure. The filling level monitor integrated into the extinguishing agent tank reports a loss of extinguishing agent to the evaluation electronics which indicates this fault (extinguishing agent loss) on the display and if necessary transmits it to superordinated systems.

The power supply for the Smoke Aspirating System is secured from 2 sources. Once source is a power supply unit (6) which also charges the batteries for the emergency power supply (4). The other source is the emergency power supply which is switched in parallel. The emergency power supply is designed for the uninterrupted operation of the system for 4 hours.

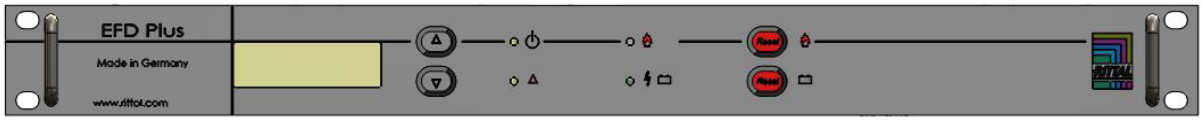
The control and display of the current state of the device is achieved via the integrated control unit. This has both LED indicators and an LCD display to display the current status. The LEDs are used to display collective conditions, whereas the individual conditions are displayed in detail as clear text on the LCD.

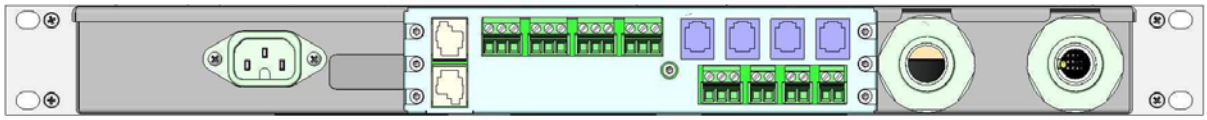
If there are several messages, the cursor keys can be used to switch between them. The existing messages are sorted in accordance with their priority and the order of arrival. If the cursor keys are not used for a duration of 30 seconds, the display switches back to the normal state.

The display of collective conditions via the LEDs of the control unit is independent of the content of the LCD and therefore independent of the scrolling using the cursor keys. It always represents the current system state.

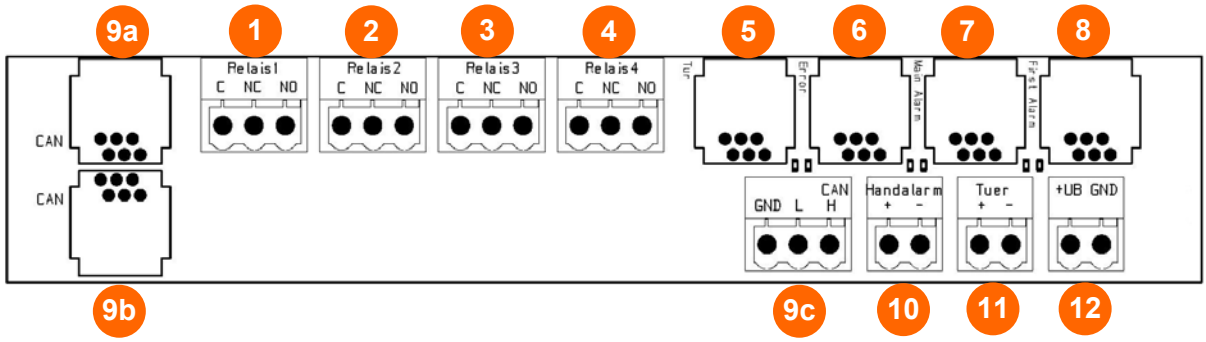
Besides the cursor keys the control unit has another two keys for resetting stored messages.

Front view





2.4 Connections



1) Relay output “pre-alarm”, see 2.4.4
2) Relay output “fire alarm”, see 2.4.4
3) Relay output “extinguishing released”, see 2.4.4
4) Relay output “common failure”, see 2.4.4
5) Connector (RJ12) to connect door switch (door contact 1), see 2.4.1
6) Connector (RJ12) to connect to Rittal CMC I/O unit (error)
7) Connector (RJ12) to connect to Rittal CMC I/O unit (fire alarm)
8) Connector (RJ12) to connect to Rittal CMC I/O unit (pre-alarm)
9a) CAN-bus connection to subordinated device (DET-AC Plus Slave)
9b) CAN-bus connection without use
9c) Still without function - reserved for future applications
10) Two-pole plug for manual release / manual alarm
(delivery incl. terminating resistor 1.8K), see 2.4.2
11) Two-pole plug for door contact 2 (delivery incl. 2 terminating resistors 22K), see 2.4.1
12) Two-pole plug for power supply (U_S), see 2.4.3

Wiring
To the positions 9 to 12 applies: The cables used may not be longer than 20 m per terminal. The minimum cable diameter amounts to 0.5 mm^2.

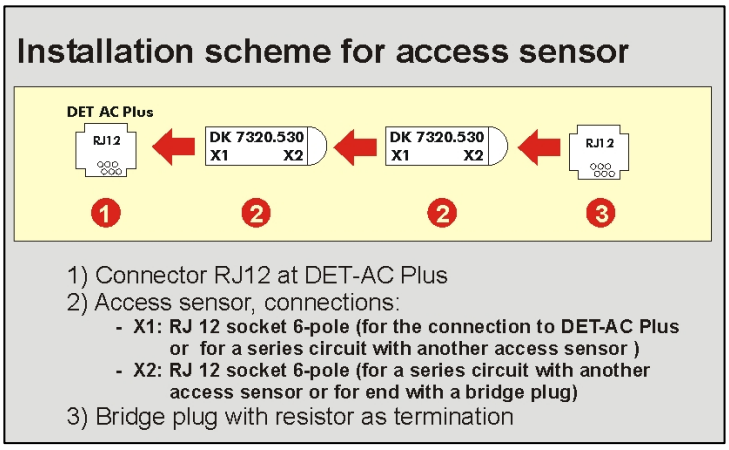
Attention!
The electrical connection (mains connection) including PE made available on site is to be realised acc. to EN 50173 and EN 50174.

Mechanical connection data of the terminal

Type of cable	min.	max.
Conductor cross-section rigid	0,34 mm^2	2,5 mm^2
Conductor cross-section flexible	0,2 mm^2	2,5 mm^2
Conductor cross-section flexible with wire-end sleeve without plastic sleeve	0,25 mm^2	2,5 mm^2
Conductor cross-section flexible with wire-end sleeve with plastic sleeve	0,25 mm^2	2,5 mm^2
Conductor cross-section AWG/kcmil	24	12
2 conductors with similar cross-section rigid	0,2 mm^2	1 mm^2
2 conductors with similar cross-section flexible	0,2 mm^2	1,5 mm^2
2 conductors with similar cross-section flexible with AEH without plastic sleeve	0,25 mm^2	1 mm^2
2 conductors with similar cross-section flexible with TWIN-AEH with plastic sleeve	0,5 mm^2	1,5 mm^2

2.4.1 Door contact (Blocking of a connected extinguishing system)

Via the input "door switch" the release of the extinguishing system is blocked.
For each cabinet the door contacts are connected to the respective device. When actuating the door contacts by opening the door always the entire fire detection and extinguishing system is blocked (up to max. 5 server cabinets). This is necessary because the build-up of a sufficient concentration of extinguishing agent cannot be guaranteed with the door open. This blocking is displayed in the LCD and via the green flashing operating LED, also the relay “collective fault” switches. No yellow fault LED is on or flashing.



Caution!
All extinguishing requests registered during the condition "Extinguishing system blocked" (= blocking of the extinguishing system) place the device into the status "extinguishing system blocked" but do not cause the extinguishing action to be started.

Input "door switch" as RJ12 connector

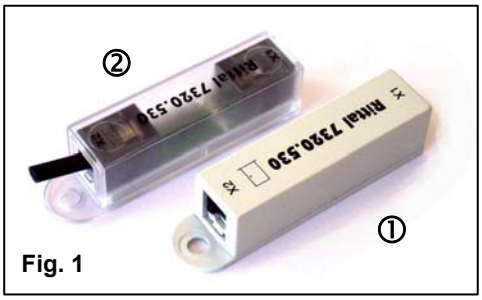


Fig. 1

One input "door switch" (5) is designed for the model Rittal 7320.530 (see fig. 1). As termination an RJ12 connector with a resistor is provided (see fig. 2).

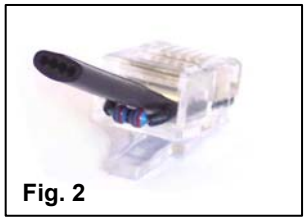


Fig. 2

With door switches in old version (fig. 1, ①) to the 22kΩ terminating resistor a 22kΩ resistor is switched parallel at the output of the last switch, as soon as all doors are closed, so that with normal operation a resistance of 11kΩ adjusts itself. With open door a resistance of 22kΩ adjusts itself.
With door switches in new version (fig. 1, ②) a 1KΩ terminating resistor is plugged into the output X2 of the last switch. If all doors are closed, in normal operation only that 1KΩ terminating resistor is in the monitoring circle. With each door, that is opened, a 22kΩ resistor is switched parallel to this 1KΩ resistor.

Via the connection X2 several door switches of this type can be switched in series (max. 10 door switches).

Brief Information: Door Contact Switch

	terminating resistor		switch setting	
design	ohm	marking	DIP 6	DIP 7
old	22k	none	OFF	ON
new	1k	white point	ON	OFF

Selection of door contact via hardware switchover
The door contact is also integrated in the software, so that it must be differentiated between the old grey door switch ① and the new transparent door switch ②.
The respective door switch is selected via the hardware as follows:

- Function of old door switch: On the control card at the DIP switch S3 of the slide switch 6 is set on OFF and the slide switch 7 is set on ON
- Function of new door switch: On the control card at the DIP switch S3 of the slide switch 6 is set on ON and the slide switch 7 is set on OFF

Note: After change of the slide switch position the device must be switched dead completely, meaning the battery must be short-time disconnected (hardware reset) if necessary. Afterwards the system is to be set in operation.

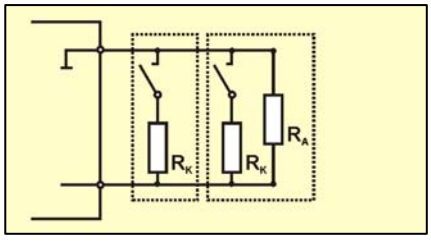
Information: The LED of the functioning switch does not shine

Caution!
In each case either the RJ12 connector **or** the two-pole plug may be used as input "door switch".

Caution!
If a fire alarm is released with blocked fire extinguishing system (indication "Extinguishing system blocked") and the blocking is abolished with queued alarm, e.g. by closing the door, the extinguishing action is started one second after abolition of the blocking.

2.4.2 Manual release / manual alarm

By operating an optional connectable push button the fire alarm is released. If an extinguishing system DET-AC Plus Slave is connected also the extinguishing action is triggered manually.



Switch open	**= Quiescence**
Switch closed	**= Alarm**

The resistors must be dimensioned as follows:

- R_A: 1K8 Ohm, 0.5 Watt (included in delivery)
- R_K: 470 Ohm, 0.5 Watt

To release a fire alarm / to trigger the extinguishing action the push button "manual release" must be operated for at least 1 second. The release is always direct and independent of the condition of the automatic detectors. The programmed dual detector dependency does not apply for the manual release.
The release via the input "manual release" is suppressed during an open door contact (see chapter 2.4.1) or if an external blocking is present.
The alarm message of the manual release must be reset manually (see chapter 3.5.2).

2.4.3 External power supply

For external consumers there is a two-pole connection (U_S) with an output voltage of 21-29 V DC. This output is protected by a fuse and supplied with emergency current. If the power supply is exclusively from the battery (during mains failure) the voltage can drop to 21 V DC! With less than 21 V DC the voltage is switched off automatically (deep discharge protection).

2.4.4 Relay outputs

The device has 4 relay outputs with one change-over contact each:
(connection diagram see chapter 2.4.)

Relay 1	Pre-alarm (NO)	A detector has triggered. The relay remains energised until the alarm criterion is no longer present and the reset key button has been pressed.
Relay 2	Fire alarm (NO)	The second detector has triggered or the manual release was actuated. The relay remains energised until the alarm criterion is no longer present and the reset key has been pressed.
Relay 3	Extinguishing released (NO)	The relay is energised parallel to the release of the extinguishing function and remains energised until the reset key is pressed.
Relay 4	Common failure (NC)	The relay is permanently energised. In case of a fault (exc. mains / battery fault) the relay drops out. The relay operates also with blocked fire extinguishing system, in order to forward the info „release did not take place“.

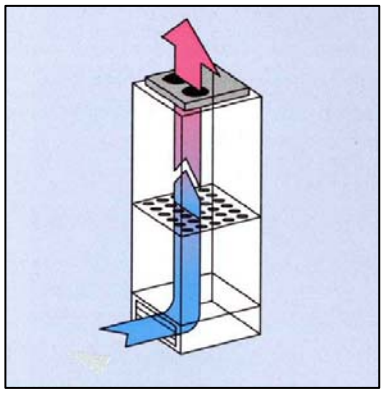
The relays 1-3 stay permanently energised when triggered. The maximum switching voltage is 30V with a maximum switching current of 0.5A and a pure resistive load. Inductive or capacitive loads require external protective circuits which must be provided by the operator.

Caution!
If the CMC-TC with I/O unit is connected via RJ12 connectors, the relay outputs must not be used!

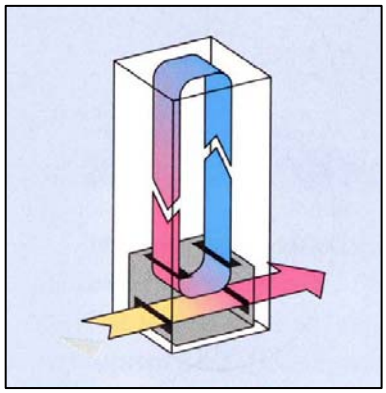
3. Installation, operation and control of the EFD Plus Smoke Aspirating System

3.1 Conditions for use and installation

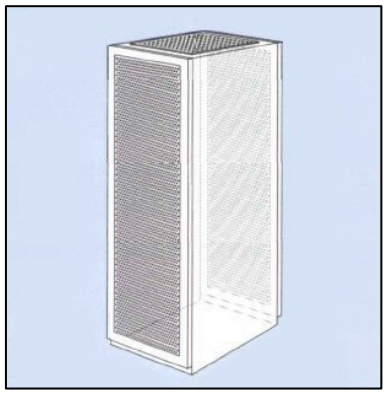
- Permitted ambient temperature range: +10 °C to +35 °C
- Temperature difference between the air sucked in and the installation location of the device max. 5 °C
- Relative humidity: up to 96 %, humidifying inside the device through temperature change is not permitted
- Ambient air low in dust and contamination
- The use in areas where gases or vapours corrosive to metal or plastic can be sucked in is not permitted
- The installation of the device in areas with vibrations caused e.g. by nearby punching machines is not permitted
- Operation only with closed cooling air circuit within the airtight closed cabinet or closed cabinet without ventilation (see drawings below), the air exchange rate of the switch cabinet system to be protected must be very low. Operation with open cooling air circuit only with limitations.
- A free slot located at any place the cabinet
- Existing minimum installation depth of 480 mm
- 100/240 Volt mains connection
- IP 55 if cable duct from the bottom
- IP 55 if cable duct from the top



Installation of the EFD Plus Smoke Aspirating System in a cabinet with open cooling air circuit is possible only with limitations!



Installation of the EFD Plus Smoke Aspirating System in a closed cabinet with closed cooling air circuit is possible.



Installation of the EFD Plus Smoke Aspirating System in a airtight closed cabinet without cooling air circuit is possible.

Installation of the EFD Plus Active Fire Extinguishing System in differently equipped racks only after prior consultation with the expert company.

3.2 Installation and commissioning of the device

Note
Ensure early on that the cabinet to be protected meets all space and installation option requirements to enable the proper installation of the EFD Plus Smoke Aspirating System.
During installation consider the switching off of electrical devices within the monitoring area during a fire in order to remove the supporting electric energy early on.

Note
Always retain the transport packaging of the EFD Plus Smoke Aspirating System. For maintenance or repair the device may only be sent in the special original transport packaging or a equivalent one.

Scope of delivery

- EFD Plus Smoke Aspirating System incl. set of batteries (consisting of 2 batteries, already inserted), mains cable, 1 pcs. terminating resistor 1,8K for manual release / manual alarm (already inserted in RJ12 connector), 3 pcs. terminating resistors 22K for door contact (2 pcs. inserted in RJ12 connector, 1 pcs. inserted in two-pole plug)
- Operating manual German (order number 90 7134) and English (order number 90 7135) version
- 4 pcs. oval-head screws DIN 7985 - M5x16
  (to attach the device with M5 cage nuts via the front panel to the 19" frame, M5 cap 4x)
- sliding rail of varying depth left / right
- Raised head M4x6 in accordance to ISO 7380 12x (for fixing sliding rail)

Recommended accessories:

- Sampling pipe (Art.-Nr. 90 6795)
- Door contact switch

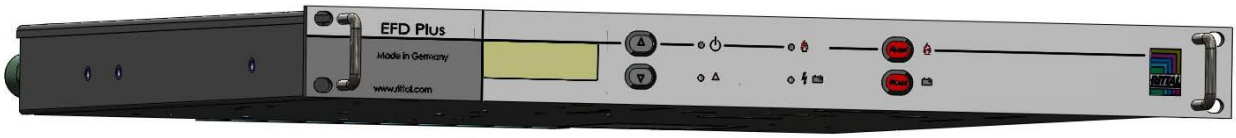
3.2.1 Installation notes

Caution!

- All tasks developing smoke and dust (smoking, soldering, cleaning etc.) must be prevented during installation and commissioning of the device!
- It is possible for an alarm to be triggered during commissioning!
  It must be ensured that any controls downstream from the device (e.g. extinguishing systems or transmitted messages) have been switched off beforehand!

The device can be installed in any free slot of a 19" switch cabinet system to be protected, but preferably on eye level, in order to ensure a simple reading off of the messages and indications.

Care must be taken that the sampling pipe at the intake side of the air conditioning unit is installed vertically and the bores of the sampling pipe are directed against the air flow!



Caution!

After installation a smoke response test must be carried out (see 7.1.6)!
Before the trigger test the door must be opened to block the extinguishing action. This must be checked via the green flashing operating LED and the indication "extinguishing system blocked" in the display.
After the trigger test at least 2 minutes must pass to allow the test gas concentration in the detector heads to dissipate and the alarm must be reset.
No fire message (red LED) may be indicated before the blocking is cancelled by closing the doors, otherwise - with connected extinguishing system - the extinguishing action will be initiated!

3.2.2 Installation steps and functional test

Caution!
Please always carry out the installation steps in the order given below. Record the steps in the installation and test report (see appendix)

Installation steps:

- Install the sliding rails (supplied by customer) to support the device
- Open the cover plate of the battery compartment
- Attach the plug of the batteries for emergency power supply to the free plug contact. Thus the batteries are attached in 24 V function! (see figure 1)
  Caution! The battery must only be connected if it is immediately followed by connecting the mains supply since otherwise the batteries will be discharged!
- Screw the cover plate of the battery compartment back
- Slide the device horizontally onto the sliding rails. Ensure that the device slides in easily without jamming up to the stop of the font panel at the frame
- Attach the device to the front panel using four of the screws and block plastic washers included through the holes of the front panel in the 19" frame (see figure 2)
- Install the sampling pipe (see chapter 3.2.3)
- Connect the device to the 100/240 V power supply
- Press the button "Reset PS (power supply)"

For the subsequent functional tests of the device and of additional devices see installation- and test report (see 7.1); connection of additional electrical devices see chapter 3.3

Figure 1
Connecting the batteries

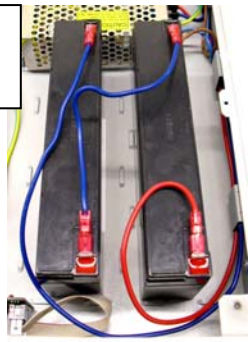


Figure 2
Attachment in the cabinet

3.2.3 Installation notes for the sampling pipe

Note
The sampling pipe system is a self sealing and self-locking pipe system.
With the plugging together of pipe and fitting the pipe union is completely done.

Caution!
Sampling pipe connection:
- Ensure the correct connection of the sampling pipe (air intake) to the device! Never connect to the air flow return (air outlet).
- An L-shaped plug-in connection (angle) with the opening facing downwards must be fitted to the air outlet to comply with IP 20.

The vertical sampling pipe must be attached at a location aiding the flow (bores of the sampling pipe directed against the air flow) using the clamps. The bores may not be covered by the clamps!
The diagrams on the following page indicate the fans. It is assumed that the fans on the side of the sampling pipe aspirate air from the cabinet. The 4 holes in the sampling pipe must be directed away from the fans towards the cabinet!

The sampling pipe is sealed with an angle and a plug at the bottom.

A trigger test using test aerosol must always be carried out!
(**Caution**, to do so block the potentially connected extinguishing system, see 7.1.2)

Number of bores
The number of bores depends on the number of supervised cabinets.
The following table is to be considered:

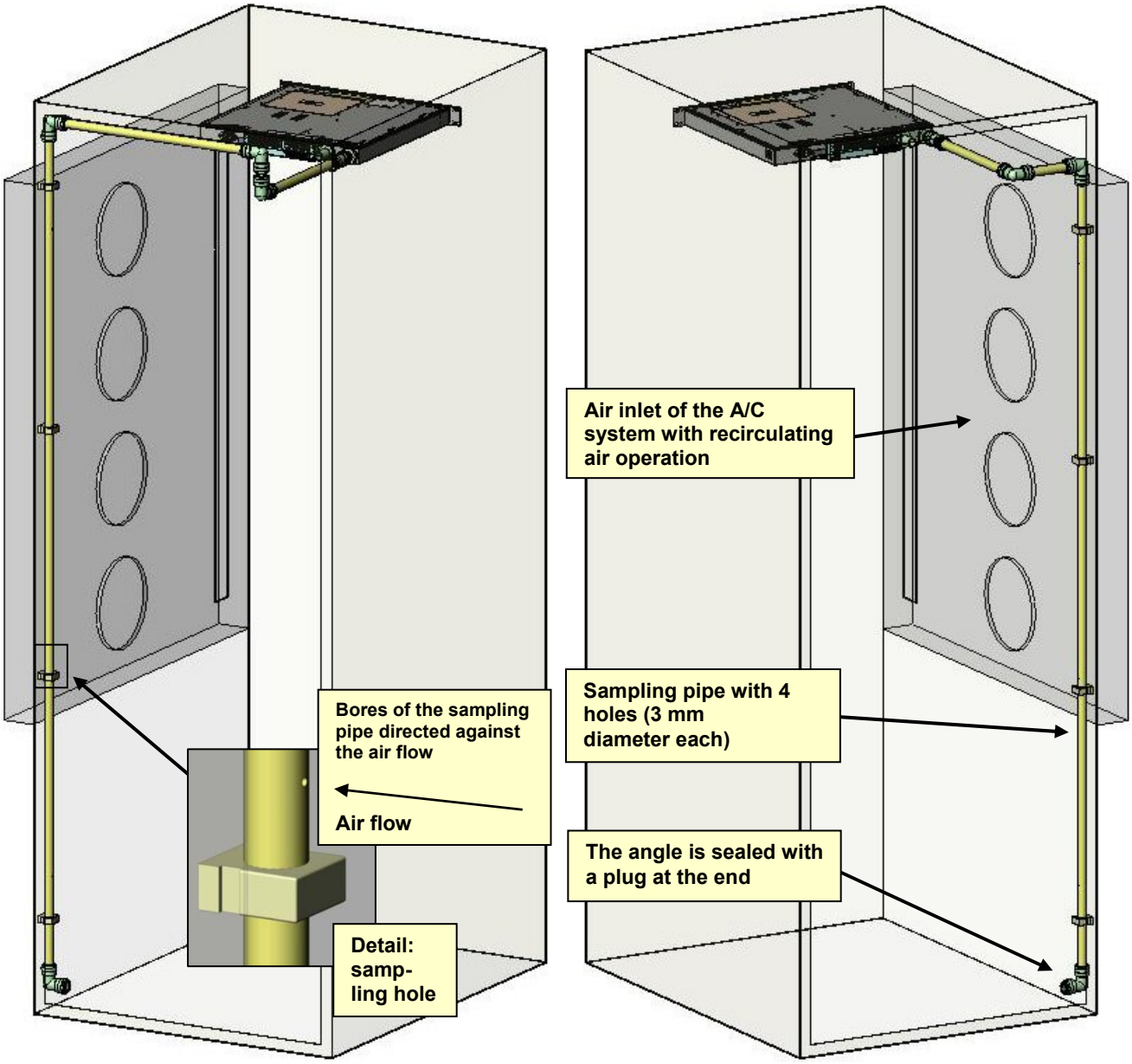
1 cabinet = 4 bores
2 cabinets = 2 x 4 bores (= 8 bores)
3 cabinets = 3 x 4 bores (= 12 bores)
4 cabinets = 4 x 3 bores (= 12 bores)
5 cabinets = 5 x 3 bores (= 15 bores)

Caution!
The following figures are recommendations. Other arrangements for fans and air conditioning devices might require a different position of the sampling pipe. The installation of the device must always be coordinated with the operator. During future changes of the cable configuration the bores of the sampling pipe have to remain free. The pipe system must not obstruct the future cable routing within the cabinet!

Sampling pipe installation options

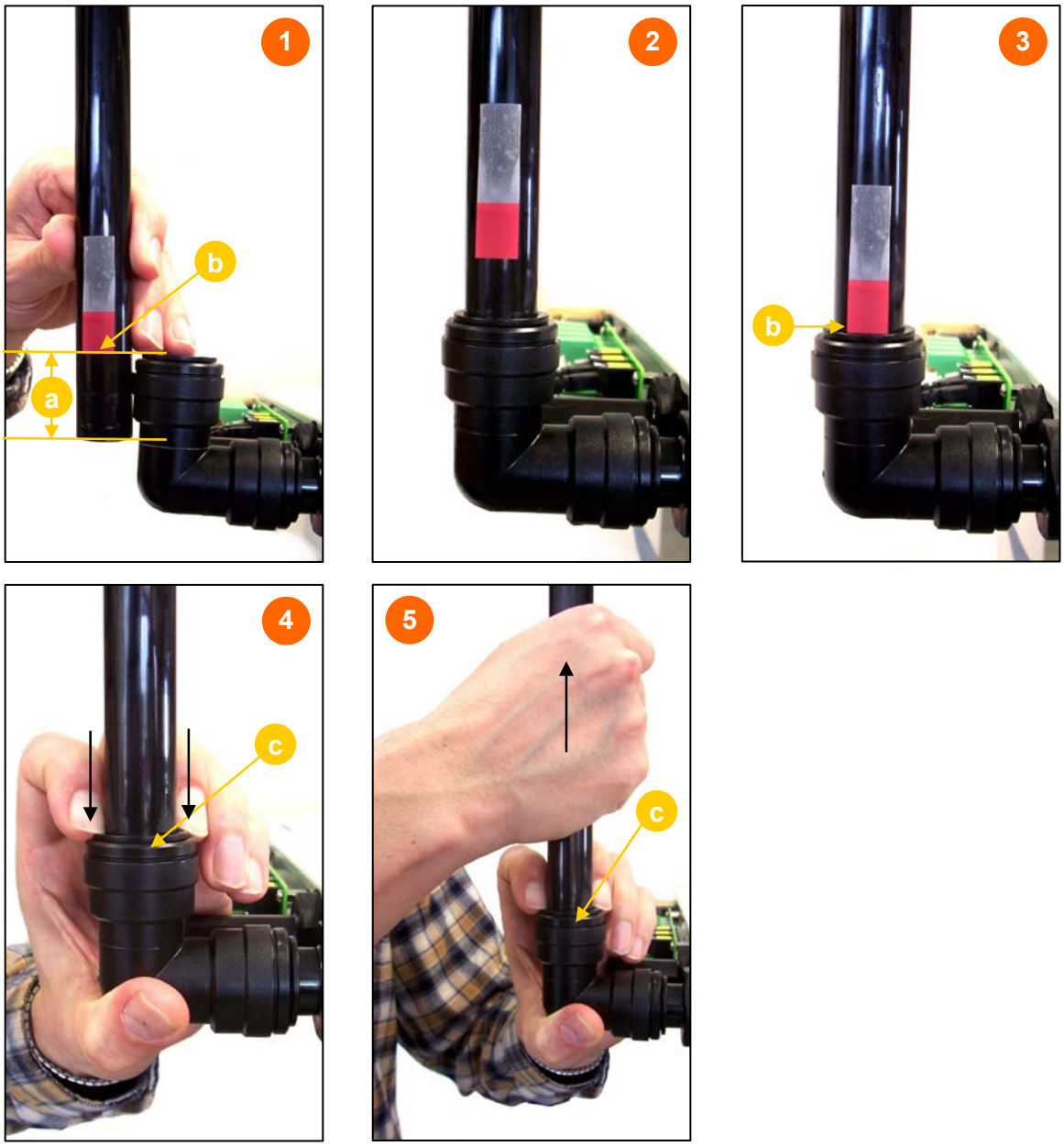
Installation of the sampling pipe with routing on the right cabinet side

Installation of the sampling pipe with routing on the left cabinet side



In racks without air conditioning a varying installation of the sampling pipe can be needful.

Installation of the sampling pipe



Installation of the sampling pipe

1) Mark the insertion depth (a) of the pipe (b)
   (use guiding line at the pipe angle! Insertion depth (a) approx. 33 mm)
2) Insert pipe loosely
3) Press in the pipe strongly until the stop can be heard and felt and up to the marking (b)

Removal of the sampling pipe

4) Press the fixing element (c) down
   (only visible as a ring from the outside)
5) Pull out the pipe with the fixing element (c) pressed down

3.3 Installation and commissioning of additional electric devices

After the proper installation and commissioning of the EFD Plus Smoke Aspirating System additional electric devices can be connected.

Caution!

Connection of additional electric devices: For the connection of additional electric devices the following information must always be observed:

- It is possible for an alarm to be triggered during commissioning!
  It must be ensured that any controls downstream from the device (e.g. connected extinguishing systems or transmitted messages) have been switched off beforehand!
- Before the functional test the door must be opened to block the potentially connected extinguishing system. This must be checked via the flashing green operating LED and the indication "extinguishing system blocked".
  No fire message (red LED) may be indicated before the blocking is cancelled by closing the doors, otherwise the potentially connected extinguishing system will be released!
- The conditions must be checked in accordance with the installation- and test

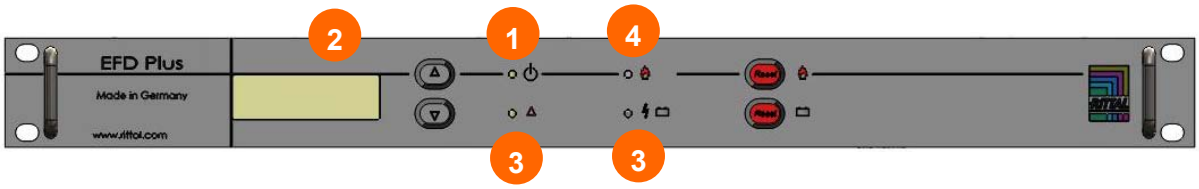
3.3.1 External alarm devices

External alarm devices, e.g. flashing lights and/or alarm horns (see also chapter spare parts and accessories) can be connected to the relay outputs pre- and main alarm (see 2.4.4 relay outputs). That max. current with 30 V DC amounts to 0.5 amp.

3.3.2 Push button for manual release

To connect the push button for manual release the sequence in the installation and test report (see 7.1.3) must be observed.

3.4 Alarms and faults



The correct operating state of the EFD Plus Smoke Aspirating System is indicated by a permanently illuminated green operating LED (1).

If a fire alarm or faults occur, they are indicated on the LCD display (2) and by fault LED (3) or alarm LED (4).

The EFD Plus Smoke Aspirating System shall therefore be installed in a clearly visible location and monitored by an overriding system, if necessary.

3.4.1 Alarm and fault messages

Alarm messages
The EFD Plus Smoke Aspirating System can implement two alarm levels with different indications and controls via two sensors responding at different sensitivities. The respective indications and their meanings are explained in the table "LCD display indications" below.

Fault messages
The EFD Plus Smoke Aspirating System monitors the most important functions itself. Faults are indicated and can be queried via the potential-free contact.
If the door of the protected cabinet (e.g. Modulsafe) is non-transparent and therefore the display is not readable possible faults can be read off from the CMC.
The respective indications and their meanings are explained in the table "LCD display indications" below.

Caution!
In case of a fault the proper functioning of the device is not guaranteed. If a fault message arrives it might not be possible to detect and extinguish a fire!
Therefore, the cause of the fault message must be immediately removed!

Caution!
Before the functional test the door must be opened to block the extinguishing action of a potentially connected extinguishing system. This must be checked via the flashing operating LED and the indication "extinguishing system blocked".
No fire message (red LED) may be indicated before the blocking is cancelled by closing the doors, otherwise the extinguishing action will be initiated!

3.5 Display and control elements

To display the current device state the extinguishing system has an LCD with background illumination and four LEDs to indicate collective conditions. Operation is via four keys on the front.

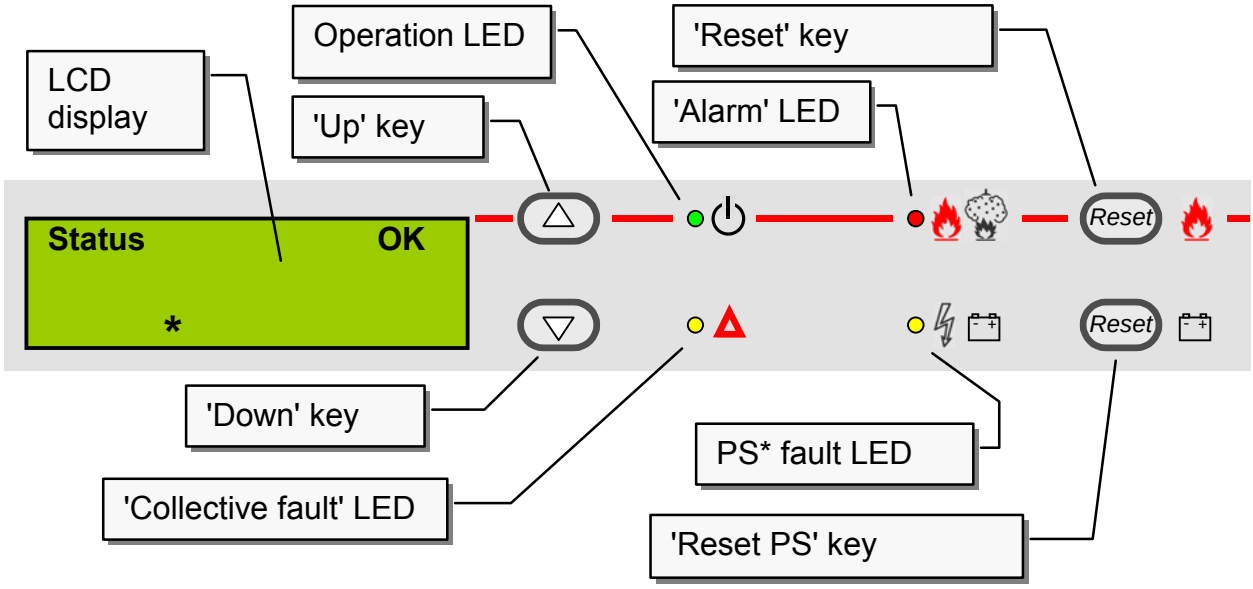


Figure 1: Display and control elements
*PS = Power Supply

3.5.1 LED indications

The collective indications are implemented via four LEDs on the front. These are activated in accordance with the indication types in Table 1.

Type of indication	Activation
off	LED is permanently off
flashing	LED is energised every 2 seconds for 200 ms
blinking	LED is alternately on for 0.5 seconds and off for 0.5 seconds
on	LED is permanently on

Table 1: LED indication types

The four LEDs implement the following indications:

LED	Colour	State	Meaning
Operation	green	off	System disconnected or not ready for operation
		on	System ready for operation
		blinking	System in operation, but extinguishing is blocked (e.g. door open)
		flashing	The system is being reset
Alarm	red	off	System at rest
		flashing	A detector has triggered with dual detector dependency programmed, but the other is still inactive (pre-alarm)
		blinking	A fire alarm has been detected but no extinguishing action has been triggered (e.g. because of a blocking present)
		on	The extinguishing action has been triggered
Collective fault	yellow	off	No faults (except possibly power supply unit faults) are present
		blinking	In conjunction with operating LED off: the central control station has failed or there is no communication between the central control station and the control panel
		blinking	In conjunction with operating LED on: faults are present which prevent an extinguishing action if requested
		on	Faults are present which do not prevent an extinguishing action
Fault Power supply unit/charger (PS)	yellow	off	Power supply unit / charger work properly
		blinking	Mains power supply failure
		on	There are faults in the power supply unit / charger

Table 2: Meaning of the LED indications

Caution!
Faults of the power supply unit / charger are not included in the collective fault indications. This means that the collective fault LED will not be activated if only faults of the power supply unit / charger are present. If faults of the power supply unit / charger are present and the collective LED is also activated in any way, this means that other faults in addition to the power supply unit / charger faults are present.

3.5.2 Keys

System operation is via four keys located on the front of the device. For the functions of the keys it is differentiated whether the system is in the state 'Message display' (normal state) or whether a control menu is active.

Key	Function	
	In the message display	**In the menus**
Up	if other older messages are present, they can be called using this key (scrolling)	previous menu entry
Down	if other more recent messages are present, they can be called using this key (scrolling)	next menu entry
Reset	currently stored messages are deleted	Cancels the selected functions or exits the current menu level (ESC). If a submenu is active this returns to the main menu. In the main menu the key returns to the message indication (exiting the control menu).
Reset PS	battery faults are reset (if they are no longer active)	Enables the selected function or accepts the settings (Enter). If this key is pressed in the main menu for an entry referring to a submenu, the submenu is activated. If no submenu exists, the allocated control function is activated.

Table 3: Function of the control keys

3.5.3 LCD display

The LCD display is used to display the individual current messages in text format. The LCD is also used to permit the menu-guided control of the system.

Message display
Normal state
In the normal state of the message display the most recent current message is displayed in the LCD (Figure 2).

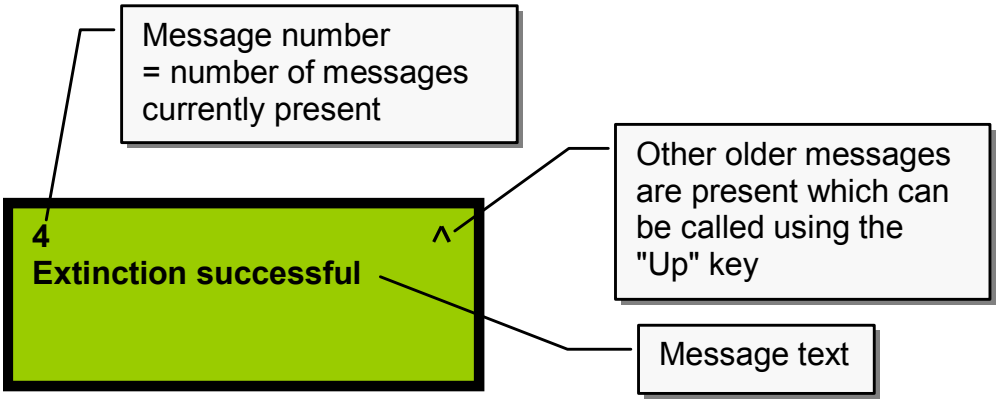


Figure 2: Normal state of the message display

If no current message is present, the message in is shown in the LCD.

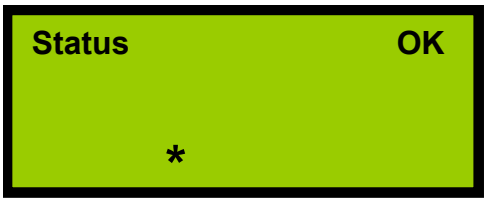


Figure 3: Display without messages

To indicate operability the character '*' runs from left to right through the screen in the lowest line. As soon as at least one message is present, the display automatically changes to the normal state of the message display.

Scrolling through messages
If more than one current message are present, the individual messages can be viewed (scrolling) using the arrow keys ('Up' and 'Down'). The message display then shows a symbol indicating that other more recent events then the one currently being displayed are present (Figure 4).

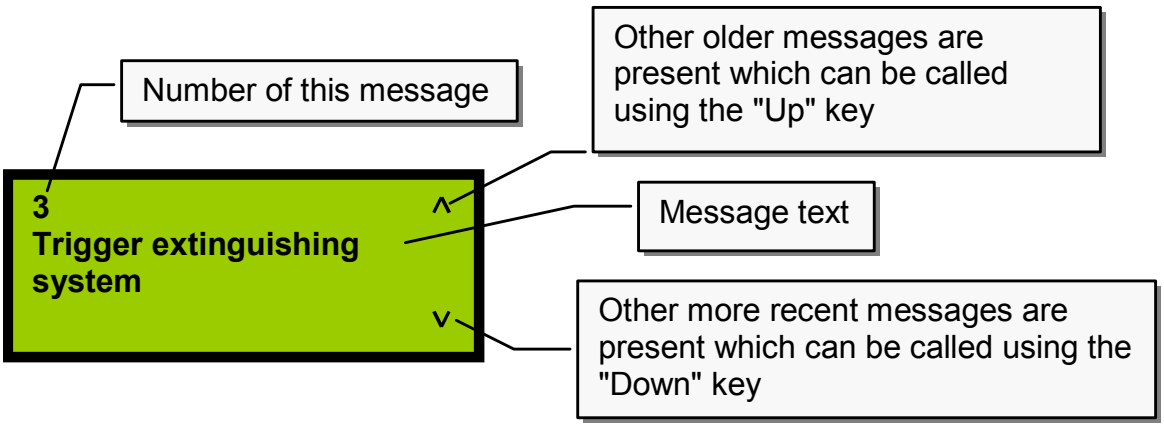


Figure 4: Scrolling through messages

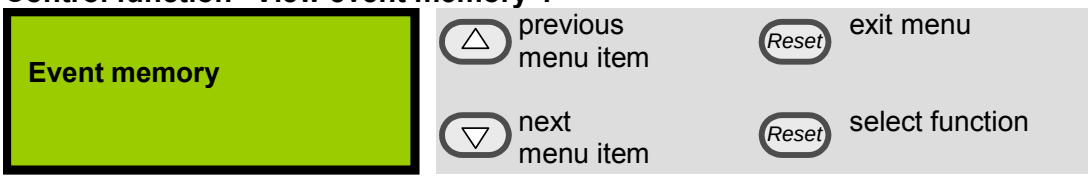
If no entry is being made in this state for 30 seconds the display automatically changes to the normal state of the message display (display of the most recent message).

Control menus

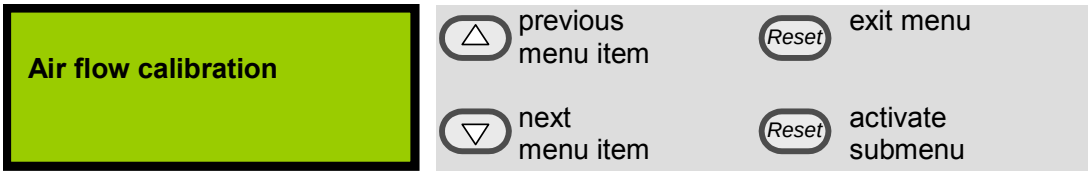
If the control panel is in the 'Message display' state, the control menu is activated by simultaneously pressing both arrow keys ('Up' and 'Down'). This operation activates the main menu and its first entry (event memory) will be shown. The control menu can be exited by pressing the 'Reset' key, if the main menu was active. An activated control menu is automatically exited if no entry is made for 30 seconds. The display then always changes to the normal state of the message display.

Main menu

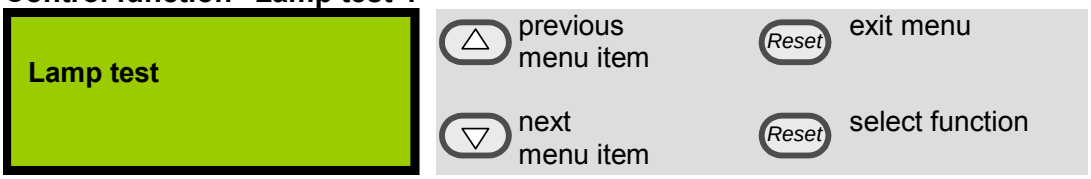
Control function "View event memory":



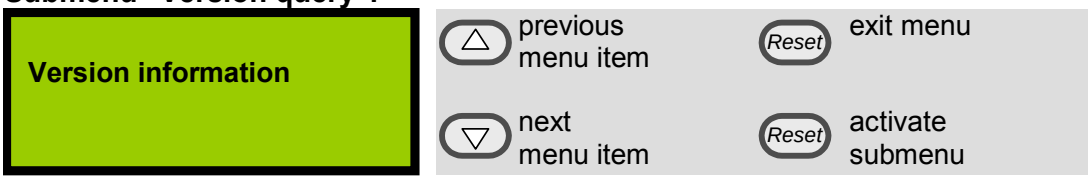
Submenu "Air flow calibration":



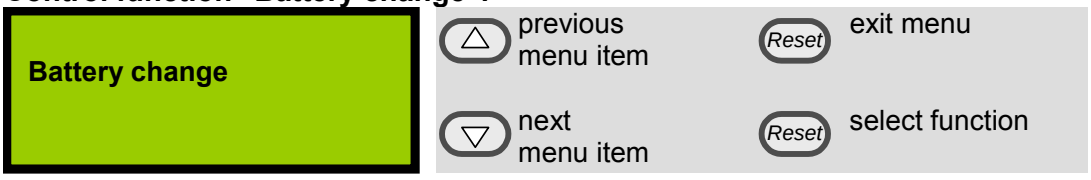
Control function "Lamp test":



Submenu "Version query":



Control function "Battery change":



Submenu Air flow calibration

Control function "Display of the current air flow measurement":

Air flow indication

△ previous submenu item

Reset back to main menu

▽ next submenu item

Reset select function

Control function "Automatic calibration of air flow monitoring":

Automatic air flow calibration

△ previous submenu item

Reset back to main menu

▽ next submenu item

Reset select function

Control function "Manual calibration of air flow monitoring":

Manual air flow calibration

△ previous submenu item

Reset back to main menu

▽ next submenu item

Reset select function

Control function "Adjusting the integration time for air flow monitoring":

Filtering time

△ previous submenu item

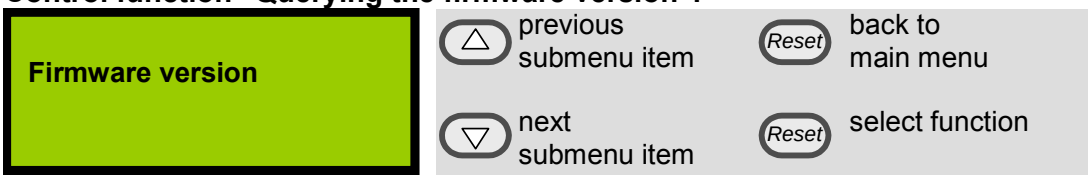
Reset back to main menu

▽ next submenu item

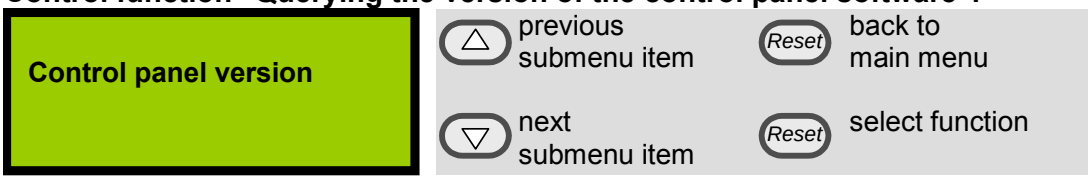
Reset select function

Submenu Version information

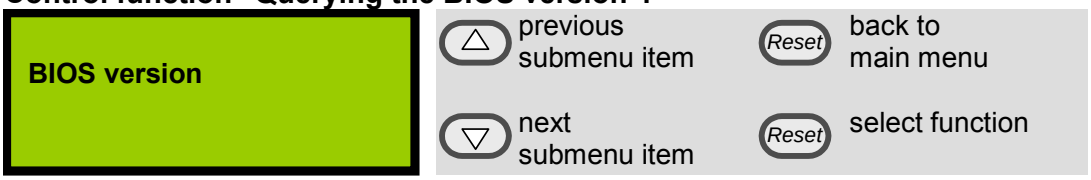
Control function "Querying the firmware version":



Control function "Querying the version of the control panel software":

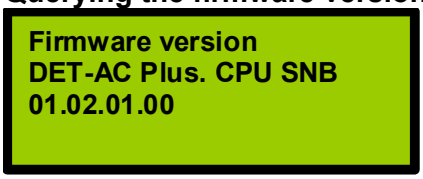


Control function "Querying the BIOS version":



Description of the menu functions

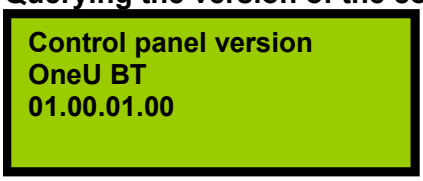
Querying the firmware version DET_SNB



△ back to menu
Reset back to menu
▽ back to menu
Reset back to menu

The following information is shown: device name, version number and date of version creation.

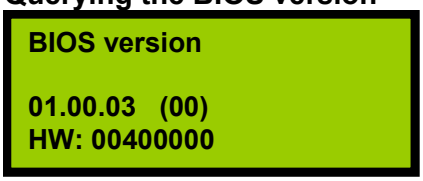
Querying the version of the control panel software



△ back to menu
Reset back to menu
▽ back to menu
Reset back to menu

The following information is shown: device name, version number and date of version creation.

Querying the BIOS version



△ back to menu
Reset back to menu
▽ back to menu
Reset back to menu

The following information is shown: version number and hardware ID.

View event memory

The display of messages from the event memory is identical to the message display of the system. To indicate that this is a display from memory the text 'EMEM' is shown at the top right. Unlike in the message display, messages are also entered in the event memory if a state causing a message has been removed. The display of the current message is either by way of a correspondingly different text message (Figure 5) or using the same message plus the symbol for current messages.

Figure 5: current message 1

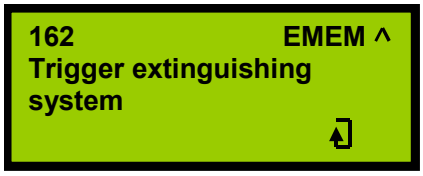
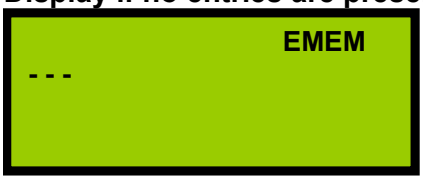


Figure 6: current message 2

The number of the message is numbered from the start of the current event memory. I.e. the oldest event still present in the memory has the number 1. If the event memory is full, the next event overwrites the so far oldest event. During the next display of the event memory the event previously carrying the number 2 now carries the number 1 (the stored events move down to allow the new event to be inserted at the top). The numbering in the event memory has no relation to the number shown for the event in the message display when the event was still current.

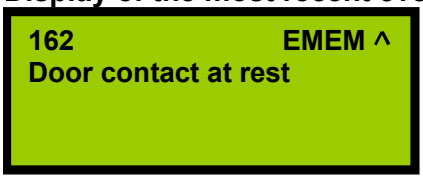
In the display of the event memory one can change from any entry to the chronologically oldest event by simultaneously pressing the two arrow keys 'UP' and 'down'. Likewise the key 'RESET EV' always leads to the chronologically recent event. If one keeps the respective arrow key longer pressed while scrolling, the display continues to run automatically into the selected direction, as long as the key remains pressed.

Display if no entries are present in the event memory



△	exit display	Reset	exit display
▽	exit display	Reset	exit display

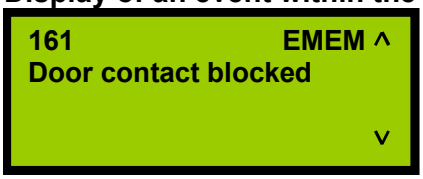
Display of the most recent event



△	to previous message	Reset	exit display
▽	no function	Reset	no function

By activating this control function "View event memory" the most recent message in time will always be displayed. Changing to older messages is possible using the arrow key "Up".
The symbol ^ at the top right of the display indicates that older messages are present.

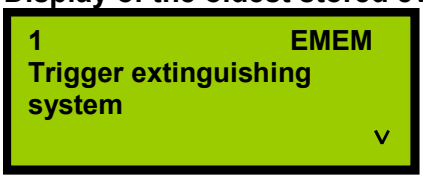
Display of an event within the memory



△	to previous message	Reset	exit display
▽	to next message	Reset	to recent message

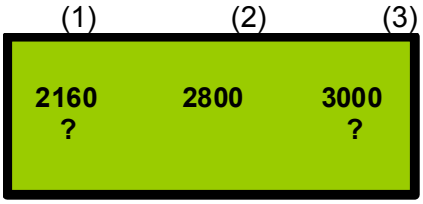
The symbol v at the bottom right of the display indicates that more recent messages are present.

Display of the oldest stored event



△	no function	Reset	exit display
▽	to next message	Reset	to recent message

Display of the current air flow measurement



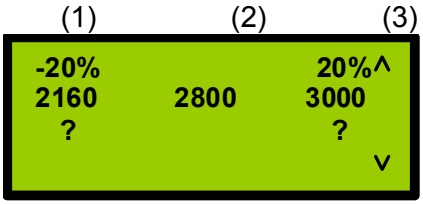
△	no function	Reset	exit display
▽	no function	Reset	exit display

(1) currently set lower limit value for monitoring
(2) current measurement
(3) currently set upper limit value for monitoring
(4) display of the current measurement as a bar graph

The current measurements and the currently set monitoring thresholds are shown. The measurement is updated cyclically to show changes.

Automatic calibration of air flow monitoring
Determination of the current values

The current values are determined! The displayed value counts up to 64 (progress indication). No operation is possible during this phase.
Please wait for this phase to complete.



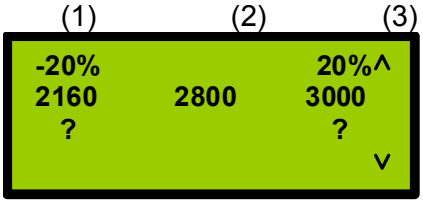
enlarge monitoring window
cancel function
minimise monitoring window
confirm current value

(1) currently set lower limit value for monitoring
(2) current measurement
(3) currently set upper limit value for monitoring
(4) display of the current measurement as a bar graph

The current measurement is determined and the corresponding thresholds are calculated from it in accordance with the selected width of the monitoring window (±10 %, ±20 % or ±40 %).
The determined values have to be confirmed to become effective (key Reset PS).

Manual calibration of air flow monitoring
Determination of the current values

The current values are determined! The displayed value counts up to 64 (progress indication). No operation is possible during this phase.
Please wait for this phase to complete.



increase monitoring range
cancel function
decrease monitoring range
confirm current value

(1) currently set lower limit value for monitoring
(2) current measurement
(3) currently set upper limit value for monitoring
(4) display of the current measurement as a bar graph

The set monitoring range is moved as a whole (lower and upper threshold simultaneously). If the width of the currently set monitoring range (here ±20 %) is to be changed, an automatic calibration must first be carried out!
The set values have to be confirmed to become effective (key Reset PS).

Adjusting the integration time for air flow monitoring (filtering time)

△	increase filtering time	Reset	cancel function
▽	decrease filtering time	Reset	confirm current value

If an arrow key is held pressed for more than 3 seconds, the value automatically changes up or down. Due to the communication method between the main processor and the control panel there is a small delay between pressing the key and the system response. This results in the value still being increased or reduced by approx. 2 when a key is released which was previously held down. The automatic function is only disabled afterwards.
Simultaneous pressing of the keys ▲ and ▼ sets the value to 0.
The set value has to be confirmed to become effective (key Reset PS).

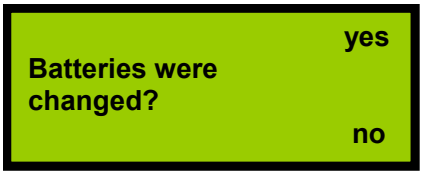
Lamp test
All segments of the LCD are blanked in black and all LEDs are switched on permanently.

△	exit test display	Reset	exit test display
▽	exit test display	Reset	exit test display

The lamp test is exited when any key is pressed. If no key is pressed for more than 5 seconds, the lamp test is automatically exited.

Battery change
The period of operation of the batteries is monitored by the system. If it exceeds the maximally permissible time, an appropriate message is displayed and the system goes into the failure mode. In order to reset this monitoring after a battery change, the function ‘battery change’ must be called up.

After the start of the function the inquiry takes place:



△ confirm change	Reset cancel function
▽ cancel function	Reset cancel function

If this question is answered with ‚yes‘, the resetting of the operating hours meter must be confirmed in the following dialogue:

△ cancel function	Reset cancel function
▽ cancel function	Reset carry out function

If the function was carried out the following confirmation message appears:

△ back to menu	Reset back to menu
▽ back to menu	Reset back to menu

After this message the operating hours meter of the batteries is reset, so that the entire maximum period of operation is available again. A failure message with the request to change the batteries eventually displayed before is reset thereafter.

If the function is discontinued in any position, a warning message appears:

△ back to menu	Reset back to menu
▽ back to menu	Reset back to menu

If this message appears, the operating hours meter of the batteries was not reset, it keeps running from the temporally last condition. A failure message with the request to change the batteries eventually displayed before is not reset thereafter.

Extinguishing agent monitoring filter time

The main menu point " Extinguishing agent monitoring filter time" is following the point "battery change". Is the value 0, the message extinguishing agent loss will reported undelayed. Is the value 1 or higher, the number show the minutes, the loss indication has to be connected without delay, before this is reported in the display.

Operating function: "Battery change"

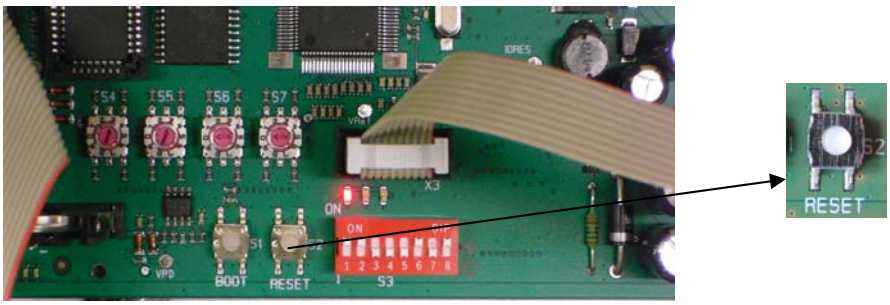
Battery change	△ previous submenu item	Reset back to main menu	
	▽ next submenu item	Reset selection function	

Operating function: "Extinguishing agent monitoring filter time"

Extinguishing agent monitoring filter time	△ previous submenu item	Reset back to main menu	
	▽ next submenu item	Reset selection function	

Operating hours meter

Apart from the monitoring of the operation hours of the batteries the system evenly monitors the period of operation since the last maintenance. If this exceeds the maximum maintenance interval, a failure message is generated (indication by LED "collective error" and triggering of relay "collective error").
For resetting this message a fabricator reset must be carried out. For this purpose the housing of the device must be opened. On the CPU board the key 'Reset' is to be pressed for longer than 3 seconds. Afterwards the failure message to the maintenance interval is deleted and the operation hours meter of the system reset. This resetting does not have any influence on the monitoring of the period of operation of the batteries.



3.5.4 LCD display - List of messages

For the following conditions messages will be displayed on the LCD display:

Display text	Display text meaning
Battery not full	The batteries for emergency power supply are not fully loaded (wait for at least 4 hours)
Fire	Both sensors have triggered a fire alarm or on of them triggered a fire alarm and the other one reported a fault without triggering the extinguishing action.
Manual release	An externally connected push button for manual release has been released.
Manual release fault	An externally connected push button for manual release is faulty or the line to it is faulty.
External blocking	The extinguishing release is blocked by a door contact switch or an external contact.
Pre-alarm	The first sensor has detected a particle with typical fire characteristics in the intake air.
Fire alarm detector 1	The first sensor has detected a particle with typical fire characteristics in the intake air.
Fire alarm detector 2	The second sensor has detected a particle with typical fire characteristics in the intake air.
Blocking by door contact	A cabinet door is open and the door contact for suppressing the extinguishing action is enabled, the possibly attached extinguishing systems cannot be triggered **or** A terminating resistor for the door switch is missing
Door contact fault	A connected door contact switch is faulty or the line to it is faulty.
Mains failure	The mains voltage is missing or the power supply unit is faulty.
Battery fault	One or both batteries are missing, not connected, fully discharged or are not being charged.
Charging fault	The charging does not function correctly.
Air flow fault, dynamic pressure too high	Contamination or blocking of the sampling pipe or of individual holes.
Air flow fault, dynamic pressure too low	Fracture or torn connection of the sampling pipe or Change in ambient conditions (changed flow velocities of an air conditioning system, open or closed doors of the 19" cabinet, etc.).
Detector 1 fault	Sensor 1 is missing, does not make contact or is faulty.

Display text	Display text meaning
Detector 2 fault	Sensor 2 is missing, does not make contact or is faulty
Extinguishing output fault	The electric release device cannot be actuated **or** the blocking switch is activated
Extinguishing agent loss*	The extinguishing agent volume has reduced due to loss
Extinguishing monitoring fault*	The monitoring device of the extinguishing agent is faulty
Maintenance interval expired	After approx. 2 years the device needs to be serviced. Call service engineer.
Battery change required	Battery life of 2 years has been exceeded. Call service engineer.
Triggering extinguishing system*	Extinguishant tank was triggered
Tank full*	Extinguishant tank was triggered but filling level indicator does not indicate loss of extinguishant
Tank empty*	Extinguishant tank was triggered and filling level indicator indicates loss of extinguishant
Battery failure	Fall below the final discharging voltage
Failure battery loading	Batteries cannot be loaded any longer
Reboot	Device accomplished a restart during the normal operation
Cold start	Reset key of the processor board was pressed
Status OK	Device is in the normal operating condition

* only relevant, when extinguishing system DET-AC Plus Slave is attached

4. Behaviour during a fire

Caution!
This information does not replace the locally prescribed behaviour during a fire in any way but serves as additional information about the behaviour during alarms/fires or release of a connected DET-AC Plus Slave extinguishing system in a cabinet protected by a EFD Plus Smoke Aspirating System!

Measures in case of an alarm in a cabinet monitored by a EFD Plus Smoke Aspirating System:

- locate smoke formation; if smoke is recognisable, shut down server and disconnect cabinet from the mains
- start fire-fighting actions, but only use suitable portable extinguishers (carbon dioxide fire extinguishers)

Measures in case of an alarm in a cabinet additionally protected by a DET-AC Plus Slave extinguishing system:

- Always keep the cabinet doors closed during the hold time (10 minutes). If the concentration required for extinguishing drops due to ventilation, any still existing source of ignition might flare up again.
- Shut off the energy supply of all consumers in the cabinet.
- If no fire or smoke can be seen, the cabinet can be ventilated with extinguishing aids (e.g. carbon dioxide fire extinguisher) at the ready.

Release of the DET-AC Plus Slave extinguishing system
The release of the DET-AC Plus Slave extinguishing system is described in the DET-AC Plus Slave manual.

5. Control, service, maintenance and repair after release

The operator carries out the regular visual inspections at the device himself.
The maintenance and repair of the device is carried out by the Rittal Service or a specialist company authorised by Rittal.

A specialist company authorised for maintenance and fault removal is a company whose employees have been trained by Rittal in the EFD Plus Smoke Aspirating System. Normally this is a member of the installation company or a specially trained employee of the operator or a specialist company commissioned by him.
In case of improper handling and faulty or missing regular inspections and maintenance Rittal does not accept any liability.

5.1 Regular inspections by the operator

Daily inspections (operator)

- No fault may be present in the EFD Plus Smoke Aspirating System.
  (operating state without fault or alarm: green operation LED is on, no yellow fault LED is on or flashing).
  Any faults present must be recorded and removal must be initiated.

Daily inspections may be omitted if it can be ensured that any faults are safely detected elsewhere.

Monthly inspection (operator)

- Sampling pipe and extinguishing nozzle must be free of external damage and the nozzle must be free of contamination and obstacles in the spray
- Sampling pipe connections must not be disconnected

Display air flow and compare with the value from the commissioning report to detect any contamination. The max. deviation to the target value must not exceed 10 %.

Quarterly inspection (operator)

This should additionally investigate any constructive modifications (especially with regard to the air tightness of the cabinet: the air exchange rate of the switch cabinet system to be protected must not be greater than 10 % within 20 min) or changes in use, and the device should be checked for the proper operation of the alarm, fault and control functions.

5.2 Tests, maintenance and repairs

Caution!
During maintenance work at the device an alarm may / should be triggered! It must be ensured that any controls downstream from the device (e.g. transmitted messages or shut-off device) have been switched off/bridged beforehand!

Caution!
Before starting maintenance work the blocking switch of all devices interlaced in the system must be on „blocked“ position!

Semi-annual maintenance (Rittal or specialist company)
Visual inspection, complete service (e.g. test and, if necessary, clean sampling pipe, check cover seal, replace filter for air flow sensor, if necessary, check air flow calibration and adjust, if necessary) plus operational check.
The history memory must be checked for errors (see 3.5.3 “View event memory”).

Biennial maintenance (Rittal or specialist company)
At least every two years the EFD Plus Smoke Aspirating System must be serviced by Rittal Service or a specialist company authorised by Rittal. During this maintenance the system is fully tested and, if necessary, returned to the target condition. Non-observance of these intervals may cause faults or false alarms and subsequent false extinguishing.
After 2 years, e.g. in the context of the first biennial maintenance, the batteries for the emergency power supply must be replaced.

For the sensor inserts integrated in the EFD Plus a total lifetime of 10 years is recommended when used within dry areas, free from dust and corrosive atmospheres. Regular inspections, maintenance, if necessary cleaning and calibration are presupposed.
In individual cases, depending upon site conditions or type of sensor, shorter intervals for replacement can be necessary.

Caution!
Fault indication for battery capacity: The fault indication of the available battery capacity responds to a remaining capacity of less than approx. 70%. With a battery replacement or with the initial commissioning it can come to the fact that the message "Battery not full" appears, since the new batteries were stored for a too long time. This indication disappears only, when a battery capacity of > 70 % is reached.

5.3 Notes on transport

Packaging

Always retain the transport packaging of the EFD Plus Smoke Aspirating System. For maintenance or repair the device may only be sent in the special original transport packaging or a equivalent one.

6. Technical data

Housing dimensions	19“, 1HE, 470 mm deep (incl. outlet sampling pipe, without handles)
Material housing	sheet metal
Weight	approx. 8.0 kg
Nominal voltage	100/240V AC, 50/60Hz
Maximum power input	at 230 V = 132 VA at 115 V = 264 VA
Nominal power input	at 230 V = 100 VA at 115 V = 200 VA
Emergency power supply	approx. 4 h
Ambient temperature	+10 °C to +35 °C (operation), -20 °C to +65 °C (storage without batteries) -15°C to +40°C (storage batteries))
Humidity	up to 96 %, non-condensing
Protection category	IP 20
Connections	▪ 1 potential-free change-over contact "pre-alarm" (RJ12 connector) ▪ 1 potential-free change-over contact "fire alarm" (RJ12 connector) ▪ 1 potential-free change-over contact "extinguishing released" (RJ12 connector) ▪ 1 potential-free change-over contact "common failure" (RJ12 connector) ▪ 24 V -3/+5 V nominal voltage / 0.5A, resistive load (plug/bolt connector)
Displays	▪ 1 LCD with clear text display of status messages ▪ 1 LED green "operation" ▪ 1 LED red "alarm" ▪ 1 LED yellow "common failure" ▪ 1 LED yellow "power supply unit/charger fault"
Sensors (2 different scattered light sensors for 2 alarm thresholds)	▪ optical smoke detector (fire alarm) (sensitivity: approx. 3.5 %/m light obscuration) ▪ optical smoke detector HS (pre-alarm) (sensitivity: approx. 0.25 %/m light obscuration)
Sampling pipe	glueless connector system, black (outer diameter: 22 mm, inner diameter: 18 mm)
Sampling holes	min. 4 sampling holes, diameter: 3 mm
Air flow monitoring	approx. +/-10 % volume flow
External devices	▪ connection for push button for manual release ▪ connection for door contact (necessary) ▪ bus connection for system networking Rittal CMC (RJ12 connector) ▪ bus connection for DET-AC PLUS Slave (connector MPL6/6) ▪ connection for external signalling devices
Approvals	▪ electric components meets UL requirements

7. Appendix

7.1 Installation- and test report

Date of commissioning / commissioner: _____

Serial number of the device: _____

7.1.1 Procedure to start-up after installation in accordance with chapter 3.2.2

- Connection of the door contact incl. the installation of resistors
- Calling-up the menu item „air flow calibration“ (at this point the intake pipe has to be attached):
  - Simultaneous pressing of the keys „up“ and „down“
  - The heading "event memory" appears in the menu
  - Unique pressing of the key "down", the menu item "air flow calibration" appears
  - Confirm with the key „reset PS“
  - The sub menu item „indication air flow“ appears
  - Press the key „down“ once
  - The sub menu item „automatic air flow calibration“ appears

- Choosing the sub menu item „automatic air flow calibration“ (see chapter 3.5.3, subject „sub menu air flow calibration“)
- Choosing the function via the lower reset button (button „reset PS“)
- Immediate closing of the door. Waiting until the counter counted up and the air flow is indicated
- The lower limit, the upper limit and the current air flow are indicated now
- Filling in of the current values into following table (the respectively adjusted tolerance is to be marked with a cross) and confirming by use of the button „reset PS“ (Adjustment with delivery is +/- 40 %)

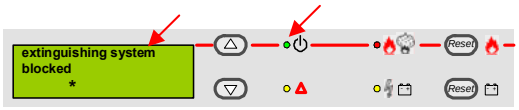
Lower limit	Current value	Upper limit	Tolerance		
			☐ 40 %	☐ 20 %	☐ 10 %

Initially 10 % should be set as permitted deviation because this setting permits the earliest possible detection of a contamination of the sampling holes. If the air flow reports frequent faults due to the flow conditions, the tolerance can be raised to 20 or 40 %.

7.1.2 Check of the alarm function

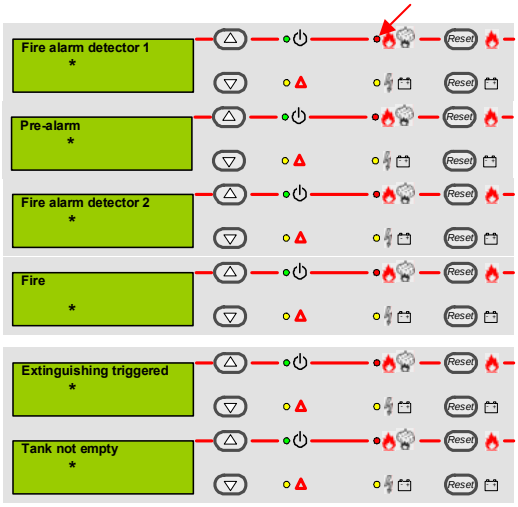
With closed door the device is now ready for use: The green LED glows and in the display "status OK" is indicated. If this is not the case, the key "reset" is to be pressed. After that the green LED flashes twice and messages that were still queued up are reset.

- Opening the door: The message " extinguishing system blocked" appears and the green LED flashes.



- Disabling of the system by pulling the door contact plug at the rear of the device. By this measure the door switch is set out of function. Now additionally the message "Door contact fault" appears in the display.
- The system has to be switched of with the blocked switch on the back side (off). Herewith the escapement for the cartridge is deactivated.
- Release of the device by means of test gas at the final hole of the sampling pipe (spray approx. 2 seconds directly into the sampling hole)
- The device reported the actual information

  - "Fire alarm detector 1", "Pre-alarm",
  - "Fire alarm detector 1",
  - "fire" and the red LED flashes
  - Tank full



- Reset the alarm after 2 minutes at the earliest (in order that the test gas is completely sucked off from the measuring chamber) with the button "reset". The red LED stops flashing and the alarm messages in the display disappear.

The information tank full will be generated if no extinguishing agent leave the tank. (Test)

7.1.3 Procedure when connecting push buttons for manual release / manual alarm

If no push buttons for manual release are to be connected, this point can be ignored.

- Connecting the manual alarm acc. to 2.4.2 to outlet manual alarm 10 (see chapter 2.4)
- Reset the fault signal that appears during connection with the button "reset".
- Releasing the manual alarm: The red LED must flash now and "manual release" and "fire" must be indicated in the display.
- Reset the manual alarm and push the button „reset“.

7.1.4 Test of air flow monitoring

- Note: To check the air flow monitoring 2 sampling holes must be closed with insulating tape. After the set filtering time the yellow fault LED must illuminate and the message air flow too low must appear in the display.
- Closing of 2 sampling holes with insulating tape: The message “Air flow fault, dynamic pressure too low” must be appear in the display.
- Remove the insulating tape from the sampling holes again and push the button „reset“: The message “Air flow fault, dynamic pressure too low” is not indicated any longer.

7.1.5 Reactivating the system

- The message "fire" may now be indicated in the display no more and the red LED must not flash any more.
- Attach the previously removed door contact plug. Press the button "reset" and close the door. "status OK" must now be indicated in the display again and the green LED must glow permanently.

Caution!
Thus the blocking of a connected fire extinguishing system is abrogated. An activation of the fire extinguishing system thus also place takes with opened door. A check of the device may only be carried out if no message „Door contact fault“ is on the display.

Installation check list

Checking off this check list helps to avoid errors during the installation.

	The number of sampling holes per server cabinet is correct, see chapter 3.2.3 „Installation notes for the sampling pipe“)
	The sampling pipes are plugged together correctly (to a complete stop) (Examination: pipes cannot be pulled apart)
	The sampling holes are faced in air flow direction
	Sampling holes are free (clean and not covered by cable harnesses)
	The air flow indicated at the device is more than 200 and smaller than 2000
	The power plug is attached
	The power plug fits tightly in the IEC power connector
	The batteries are attached
	The nozzle is free from cable harnesses and other obstructions
	In case of use of the RJ12 plug for the door contact monitoring the terminal resistance at the clamp connection „input door switch“ was removed.
	With open door „fire extinguishing system blocked“ is indicated on the display (with several server cabinets only one open door is enough) and the green LED flashes
	The door contacts including the magnets are securely and firmly installed
	During the test release acc. to the commissioning instructions both sensors of the device stated „pre-alarm “and „fire“ **Caution!** Carry out test only with opened door, with the indication „fire extinguishing system blocked“ on the display
	When closing 2 sampling holes the device indicated „pressure too low“
	If mains supply is separated the device continues to run on emergency power supply
	The front plate is firmly connected with the server cabinet with 2 and/or 4 screws
	With closed door„Status OK“ is indicated on the display and on the display a star moves from left to right and only the green LED permanently shines
	Name: Date:
	Device handed over to:

Installation check list

Checking off this check list helps to avoid errors during the installation.

	The number of sampling holes per server cabinet is correct, see chapter 3.2.3 „Installation notes for the sampling pipe“)
	The sampling pipes are plugged together correctly (to a complete stop) (Examination: pipes cannot be pulled apart)
	The sampling holes are faced in air flow direction
	Sampling holes are free (clean and not covered by cable harnesses)
	The air flow indicated at the device is more than 200 and smaller than 2000
	The power plug is attached
	The power plug fits tightly in the IEC power connector
	The batteries are attached
	The nozzle is free from cable harnesses and other obstructions
	In case of use of the RJ12 plug for the door contact monitoring the terminal resistance at the clamp connection „input door switch“ was removed.
	With open door „fire extinguishing system blocked“ is indicated on the display (with several server cabinets only one open door is enough) and the green LED flashes
	The door contacts including the magnets are securely and firmly installed
	During the test release acc. to the commissioning instructions both sensors of the device stated „pre-alarm “and „fire“ **Caution!** Carry out test only with opened door, with the indication „fire extinguishing system blocked“ on the display
	When closing 2 sampling holes the device indicated „pressure too low“
	If mains supply is separated the device continues to run on emergency power supply
	The front plate is firmly connected with the server cabinet with 2 and/or 4 screws
	With closed door„Status OK“ is indicated on the display and on the display a star moves from left to right and only the green LED permanently shines
	Name: Date:
	Device handed over to:

Installation check list

Checking off this check list helps to avoid errors during the installation.

	The number of sampling holes per server cabinet is correct, see chapter 3.2.3 „Installation notes for the sampling pipe“)
	The sampling pipes are plugged together correctly (to a complete stop) (Examination: pipes cannot be pulled apart)
	The sampling holes are faced in air flow direction
	Sampling holes are free (clean and not covered by cable harnesses)
	The air flow indicated at the device is more than 200 and smaller than 2000
	The power plug is attached
	The power plug fits tightly in the IEC power connector
	The batteries are attached
	The nozzle is free from cable harnesses and other obstructions
	In case of use of the RJ12 plug for the door contact monitoring the terminal resistance at the clamp connection „input door switch“ was removed.
	With open door „fire extinguishing system blocked“ is indicated on the display (with several server cabinets only one open door is enough) and the green LED flashes
	The door contacts including the magnets are securely and firmly installed
	During the test release acc. to the commissioning instructions both sensors of the device stated „pre-alarm “and „fire“ **Caution!** Carry out test only with opened door, with the indication „fire extinguishing system blocked“ on the display
	When closing 2 sampling holes the device indicated „pressure too low“
	If mains supply is separated the device continues to run on emergency power supply
	The front plate is firmly connected with the server cabinet with 2 and/or 4 screws
	With closed door„Status OK“ is indicated on the display and on the display a star moves from left to right and only the green LED permanently shines
	Name: Date:
	Device handed over to:

Installation check list

Checking off this check list helps to avoid errors during the installation.

	The number of sampling holes per server cabinet is correct, see chapter 3.2.3 „Installation notes for the sampling pipe“)
	The sampling pipes are plugged together correctly (to a complete stop) (Examination: pipes cannot be pulled apart)
	The sampling holes are faced in air flow direction
	Sampling holes are free (clean and not covered by cable harnesses)
	The air flow indicated at the device is more than 200 and smaller than 2000
	The power plug is attached
	The power plug fits tightly in the IEC power connector
	The batteries are attached
	The nozzle is free from cable harnesses and other obstructions
	In case of use of the RJ12 plug for the door contact monitoring the terminal resistance at the clamp connection „input door switch“ was removed.
	With open door „fire extinguishing system blocked“ is indicated on the display (with several server cabinets only one open door is enough) and the green LED flashes
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	During the test release acc. to the commissioning instructions both sensors of the device stated „pre-alarm “and „fire“ **Caution!** Carry out test only with opened door, with the indication „fire extinguishing system blocked“ on the display
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	If mains supply is separated the device continues to run on emergency power supply
	The front plate is firmly connected with the server cabinet with 2 and/or 4 screws
	With closed door„Status OK“ is indicated on the display and on the display a star moves from left to right and only the green LED permanently shines
	Name: Date:
	Device handed over to:

7.2 Spare parts, accessories and consumables + tools

Item	Order number
Spare parts	
Smoke Aspirating System EFD Plus complete device	90 7124
Battery (2x 12V/ 2.2 Ah)) 2x necessary	23 6023
Fire detector head OMX1002C	90 6323
Fire detector head OMX1002C HS	90 6324
Air flow sensor filter 50µm	89 3663
Fuse 2.0 A / 250 Volt (power supply unit)	15 0240
Fuse F2 3.15 A / 250 Volt	90 3147
Fuse F3 0.630 A / 250 Volt	90 7564
Terminator resistor 22k, 0.5 watt with RJ12 connector (door contact connection)	90 6913
Terminator 1K8 Ohm, 0.5 watt (for door contact or push button for manual release)	67 5235
Resistor 470 Ohm, 0.5 watt (for door contact or push button for manual release)	67 5223
Power cable	90 6083
German operating instructions	90 7134
English operating instructions	90 7135
Accessories	
Sliding rail of varying depth	Rittal: DK 7063.880
Sampling pipe complete with attachment clips	90 7061
Optional accessories	
Test gas	90 5904
Alarm combination SONFL1 MX (flashing light + alarm horn)	90 6508
DMX 3000 push button for manual release, yellow	88 8845
Tools	
Pipe cutter	90 5281
FESTO release fork for disconnecting sampling pipe connections	90 7066
Phillips screwdriver for battery cover screws	

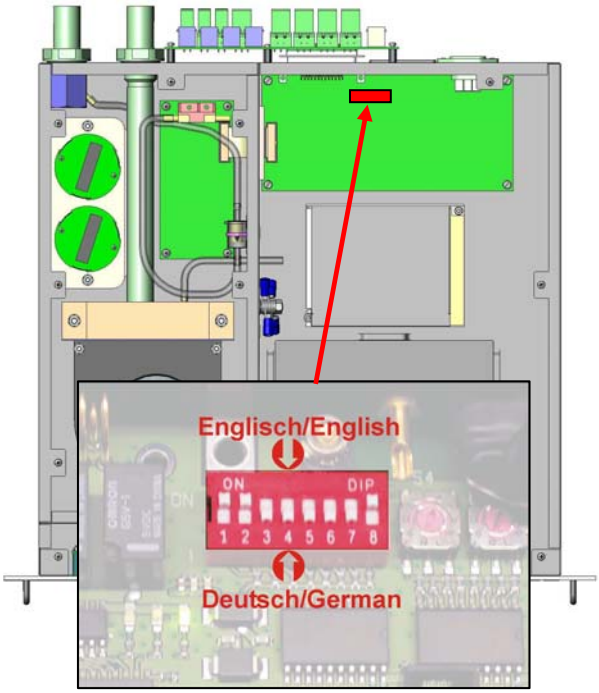
7.3 Trouble-shooting

Fault, Fault Message	Possible Cause	Necessary Measure
Power failure	▪ Mains voltage supply short-term failed	Eliminate possible disturbances of the mains voltage supply
Failure power supply unit	▪ Power supply unit does not deliver voltage for longer time (e.g. if mains cables is not attached)	Connect mains voltage supply again
Failure batteries and yellow LED power supply faulty	▪ Batteries deeply discharged or ▪ batteries not connected	Examine whether a power failure was present. If so, load batteries 24 hours in the EFD. (The fault signal must be resetable then if not, the batteries have to be exchanged).
Failure air stream - Pressure too high	▪ Sampling pipe came loose	Fix sampling pipe
Failure air stream - Pressure too low	▪ Sampling pipe badly dirty, or ▪ Filter in the air flow monitoring is dirty	Clean sampling pipe. If disturbance furthermore exists, exchange filter.
Failure sensor 1	▪ Sensor 1 faulty or ▪ Sensor 1 missing	Advise service
Failure sensor 2	▪ Sensor 2 faulty or ▪ Sensor 2 missing	Advise service
Failure door contact	▪ Short-circuit or wire break at the door contact (e.g. cable not attached) ▪ Termination plug is missing, if no door contact is planned, or RJ12 connector and two-pole plug for door contact are attached at the same time ▪ Input and output of the door contact are interchanged	Examination of the door contact plugs. Attach cables or put in termination plugs if necessary. Connect up the door contact properly
Failure push button	▪ Short-circuit or wire break at the push button for manual release (e.g. cable not attached), termination plugs is missing, if no push button for manual release unit is planned	Examination of plugs of the push button for manual release. Attach cables or put in termination plugs if necessary
Failure extinguishant monitoring	▪ Internal wire break or short-circuit to the level sensor of the tank	Advise service
Loss of extinguishant	▪ Device not inserted horizontally ▪ Loss of extinguishant in the tank	Align the device horizontally and examine whether fault message disappears, otherwise advise service
Failure release magnet	▪ Magnet or internal wiring defective	Advise service

Fault, Fault Message	Possible Cause	Necessary Measure
Tank full	▪ Extinguishing action was released during mechanical blocking ▪ The EFD plus detected a fire and the extinguishing action was triggered but the extinguishant tank was however not emptied	Advise service
No data in the event memory, although messages existed	▪ Backup battery on the processor board is missing or empty	Advise service
Failure sensor 1, failure sensor 2, failure air stream and no air discharge	▪ Interface processor board / detector board defective	Advise service
There no function of the front panel, but the aspirating fan runs and there is external 24V	▪ Interface processor board / front panel defective ▪ Plug flatcable from control card to front panel is loose	▪ Advise service ▪ Plug in plug flatcable firmly
System failure EC=0010 P=00000001	▪ Interface processor board / front panel defective	Press reset button on the processor board, advise service
Aspirating fan does not start	▪ Interface processor board / aspirating fan defective ▪ Battery empty	▪ Advise service ▪ Recharge battery
Test release with test gas does not work	▪ Test gas was not sprayed directly into the bore of the sampling pipe or ▪ Test gas was not sprayed in long enough.	Repeat test release
Display does not indicate anything, but the LED work	▪ Contrast of display is mis-adjusted	Readjust the contrast at the back potentiometer of the front panel
EFD does not run / start, although mains voltage lies close	▪ Power supply unit defective	Start of the EFD with the batteries. Disconnect the batteries by way of trial, in order to determine whether the power supply unit takes over voltage supply. If the system fails anyway then advise service
CMC does not recognise the EFD Plus	▪ Wrong software in CMC PU2; old hardware PU and not PU2, Configuration of CMC not adopted	Advise service
Message „Breakdown battery charge“	▪ Batteries cannot be charged any longer	Change batteries

7.4 Spracheinstellung / Language settings

Umstellung der Sprache für Anzeige und Bedienung / Changeover of the language for indication and operation



Umstellung der Sprache für Anzeige und Bedienung
Das Gerät kann in 2 Sprachen, Deutsch und Englisch, kommunizieren. „Deutsch“ ist werkseitig voreingestellt, kann aber über einen Dip-Schalter einfach auf „Englisch“ umgeschaltet werden.
Für das Umschalten wird wie folgt vorgegangen:

- Gerät von Netzversorgung und den Notstromakkus trennen
- Den Gerätedeckel abschrauben
- Den Dip-Schalter (siehe nebenstehendes Bild) von Position 4 „off“ (deutsch) auf „on“ (englisch) umschalten.
- Den Gerätedeckel anschrauben
- Gerät wieder in Betrieb nehmen

Changeover of the language for indication and operation
The device can communicate in 2 languages, German and English. "German" is pre-set at delivery and can simply be switched by use of a dip switch to "English".
The switching is proceeded as follows

- disconnect the device from mains supply and the battery backup
- Unscrew the cover
- Change over the dip-switch no. 4 from position „off“ (German) to „on“ (English)
- Screw on the cover
- Take device into operation again

7.5 Cross-linking / Protection of several switch cabinets

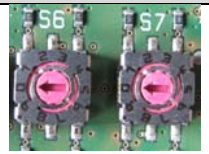
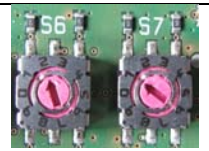
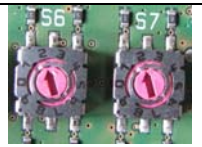
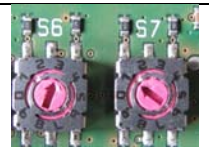
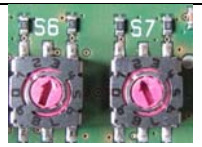
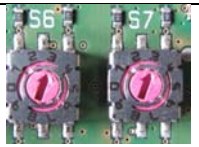
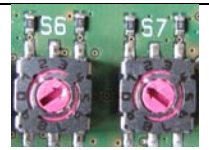
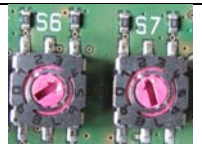
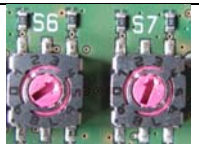
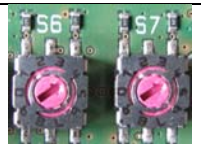
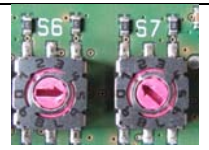
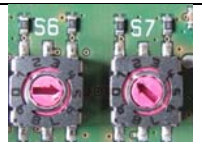
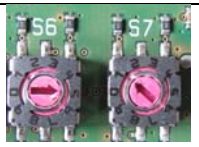
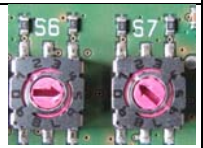
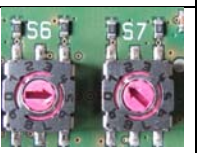
Compatibility of devices of different series

Devices DET-AC Plus Slave of the old series (article number 90 7023) can principally be attached to DET-AC plus Fire Extinguishing Systems of the new series (article number 88 9133), exactly the same devices DET-AC Plus Slave of the new series (article number 88 9214) can be attached to DET-AC plus Fire Extinguishing Systems of the old series (article number 90 6744).
As the case may be that devices of the old series with an old firmware (version 1.2.2.0 or older) cannot not be triggered (failure message “failure ignitation cap.”) or cannot trigger (no failure message), the devices of the old series must at least be equipped with the firmware starting from version 1.2.3.0 within a mixed network of devices of different series.

Function matrix for compatibility from Hard- und Software DET-AC Plus

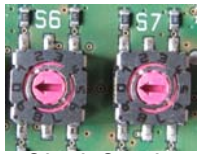
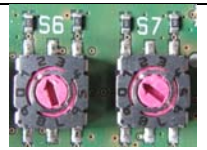
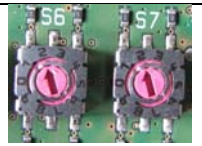
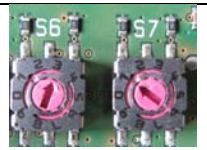
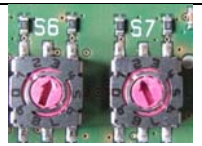
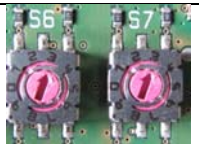
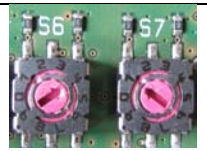
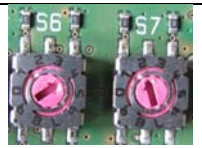
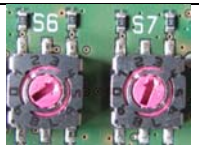
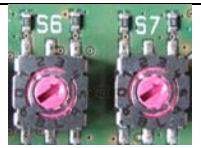
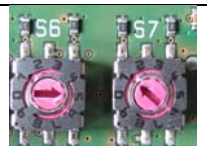
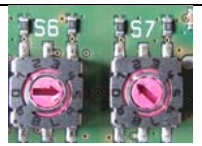
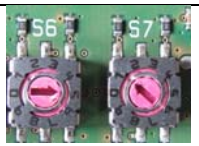
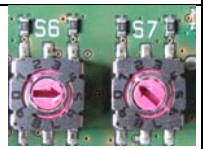
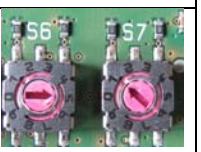
DET-AC Plus Compact / Master- und Slave device

Adjustments in combination with other units

unit Id. number Rittal Id. no.	description	Software version		addressing (S6 + S7)				
				Master	1. Slave	2. Slave	3. Slave	4. Slave
110010576295 7338.110 7338.120 (as of 06/2010)	DET-AC Plus compact	1.3.1.0 min 1.3.0.0	Software_V1.3.0.0_DET_SNBT_GerEng_Master.hex	 S6 = 0 S7 = 0	Not possible!	Not possible!	Not possible	Not possible
110010576287 7338.300 (ab 2009) 7338.320 (as of 06/2010)	DET-AC Plus Slave	1.3.1.0 min 1.3.0.0	Software_V1.3.0.0_DET_T_GerEng_Slave.hex	 S6 = 2 S7 = 1	 S6 = 2 S7 = 2	Not possible	Not possible	Not possible
110010576287 7338.300 (ab 2009) 7338.320 (as of 06/2010)	DET-AC Plus Slave	1.3.1.0 min 1.3.0.0	Software_V1.3.0.0_DET_T_GerEng_Slave.hex	 S6 = 3 S7 = 1	 S6 = 3 S7 = 2	 S6 = 3 S7 = 3	Not possible	Not possible
110010576287 7338.300 (ab 2009) 7338.320 (as of 06/2010)	DET-AC Plus Slave	1.3.1.0 min 1.3.0.0	Software_V1.3.0.0_DET_T_GerEng_Slave.hex	 S6 = 4 S7 = 2	 S6 = 4 S7 = 2	 S6 = 4 S7 = 3	 S6 = 4 S7 = 4	Not possible
110010576287 7338.300 (ab 2009) 7338.320 (as of 06/2010)	DET-AC Plus Slave	1.3.1.0 min 1.3.0.0	Software_V1.3.0.0_DET_T_GerEng_Slave.hex	 S6 = 5 S7 = 1	 S6 = 5 S7 = 2	 S6 = 5 S7 = 3	 S6 = 5 S7 = 4	 S6 = 5 S7 = 5

DET-AC Plus (old version) / Master- und Slave device

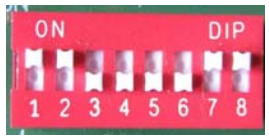
Adjustments in combination with other units

unit Id. number Rittal Id. no..	description	Software version		addressing (S6 + S7)				
				Master	1. Slave	2. Slave	3. Slave	4. Slave
110010576285 7338.100	DET-AC Plus	1.2.3.1 min 1.2.3.0	Software_V1.2.3_DET_SNBT_GerEng_Master.hex	 S6 = 0 S7 = 0	Not possible	Not possible	Not possible	Not possible
110010576283 7338.300	DET-AC Plus Slave	1.2.3.1 min 1.2.3.0	Software_V1.2.3_DET_T_GerEng_Slave.hex	 S6 = 2 S7 = 1	 S6 = 2 S7 = 2	Not possible	Not possible	Not possible
110010576283 7338.300	DET-AC Plus Slave	1.2.3.1 min 1.2.3.0	Software_V1.2.3_DET_T_GerEng_Slave.hex	 S6 = 3 S7 = 1	 S6 = 3 S7 = 2	 S6 = 3 S7 = 3	Not possible	Not possible
110010576283 7338.300	DET-AC Plus Slave	1.2.3.1 min 1.2.3.0	Software_V1.2.3_DET_T_GerEng_Slave.hex	 S6 = 4 S7 = 2	 S6 = 4 S7 = 2	 S6 = 4 S7 = 3	 S6 = 4 S7 = 4	Not possible
110010576283 7338.300	DET-AC Plus Slave	1.2.3.1 min 1.2.3.0	Software_V1.2.3_DET_T_GerEng_Slave.hex	 S6 = 5 S7 = 1	 S6 = 5 S7 = 2	 S6 = 5 S7 = 3	 S6 = 5 S7 = 4	 S6 = 5 S7 = 5

Dipswitch setting (S3) for door contact old / new for DET-AC Plus Compact / Master- und Slave unit

door contact old
(304534)
max. 4 pieces

22KΩ



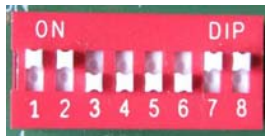
door contact new
7320.530
max. 10 pieces

1KΩ

Dipswitch setting (S3) for door contact old / new for DET-AC Plus (old version) / Master- und Slave unit

door contact old
(304534)

22KΩ



door contact new
7320.530
max. 1 pieces

22KΩ

Function matrix for compatibility from Hard- und Software EFD (2 HE) and EFD Plus

EFD Plus (Version) 2 HE

unit Id. number	description	Software version		Dipswitch setting (S3)		addressing (S6 + S7)			
				Door contact old (304534)	Door contact new 7320.530				
				22KΩ					
110011749800	EFD Plus	1.2.3.1 min 1.2.3.0	Software_V1.2.3_DET_SNB_GerEng_EFD.hex	 6 off - 7 on	 Not possible				

EFD Plus 1 HE

unit Id. number Rittal Id. no.	description	Software version		Dipswitch setting (S3)		addressing (S6 + S7)			
				Door contact old (304534 max. 4 piece	Door contact new 7320.530 max. 1 piece				
				22KΩ	1 KΩ				
1100105762286 7338.200	EFD Plus	1.3.1.0 min 1.3.0.0	Sotware_V1.3.0.0_DET_SNB_GerEng_EFD.hex	 6 off - 7 on	 6 on - 7 off				

List of abbreviations

Software_V1.2.3_DET_SNB_GerEng_EFD.hex	→	old unit - only detection
Software_V1.2.3_DET_SNBT_GerEng_Master.hex	→	old unit - detection and extinguishing tank
Software_V1.2.3_DET_T_GerEng_Slave.hex	→	old unit - only extinguishing tank
Sotware_V1.3.1.0_DET_SNB_GerEng_EFD.hex	→	new unit - only detection
Software_V1.3.1.0_DET_SNBT_GerEng_Master.hex	→	new unit - detection and extinguishing tank
Software_V1.3.1.0_DET_T_GerEng_Slave.hex	→	new unit - only extinguishing tank

Compatibility Firmware in combination with old and new units

Type	Firmware	Type	Firmware	yes	no
DET-AC Plus	1.2.3.1	DET-AC Slave Short	1.3.1.0	X	
EFD Plus	1.2.3.1	DET-AC Slave Short	1.3.1.0	X	
DET-AC Short	1.2.3.1	DET-AC Slave Plus	1.3.1.0	X	
EFD Short	1.2.3.1	DET-AC Slave Plus	1.3.1.0	X	

Connection power supply and data line
At first the mains supply is put on at the master device, then each slave device is attached to the voltage output of the upstream device.
Only, if thereafter is no fire message at the display of the master device, the data lines may be attached to the respective upstream devices.

Checking the network:
After the network is set up completely a message has to be generated at each device. Each message must be examined at the master device.
It is recommended for it to operate the door contact of each device.

Reading out the condition of the respective devices

The display of the current condition of the fire extinguishing system takes place via the master with the identification Z1 (DET-AC Plus active fire extinguishing system or EFD Plus). On its LCD display the individual devices, after being selected, are indicated. The attached device indicated by the message is to be identified as follows by its individual identifier (Z2 to Z5):

Identifier	Device, to which the message refers
Z1	DET-AC Plus active fire extinguishing system or EFD Plus (each time Master!)
Z2	DET-AC Plus Slave extinguishing system 1
Z3	DET-AC Plus Slave extinguishing system 2
Z4	DET-AC Plus Slave extinguishing system 3
Z5	DET-AC Plus Slave extinguishing system 4

Intake pipes over several cabinets

Installation of device and the intake pipes for the monitoring of several cabinets

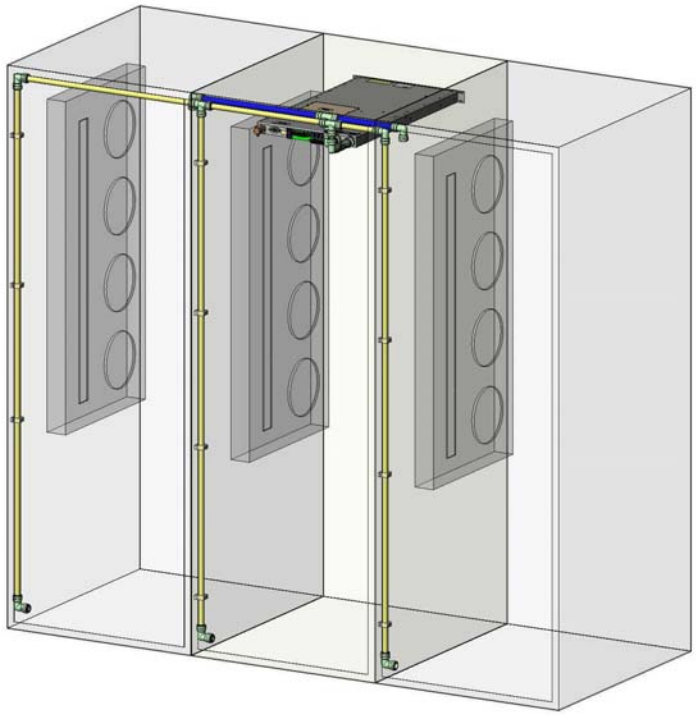
If more than two cabinets are monitored, the upstream device should be placed in a middle cabinet, so that 2 as identical as possible and flow-technically favorable pipe lines are formed.

Note!
If more several cabinets are monitored, which are hermetically locked each against the other, an equalization of pressure is to be installed by means of an air flow re-circulation.

For the pressure balance by means of an air flow re-circulation a further pipe system is to be installed. This pipe system (blue coloured in opposite sketch) is led in each cabinet with T-fittings. The ends of pipe of the air flow re-circulation remain open in each cabinet, so that the air pressure balances itself

In the opposite sketch it is assumed that the cabinets are not locked hermetically against each other.

The devices may be installed only so far away from each other that the length of the intake pipes amounts to max. 20 m. A potential equalization has to be carried out over the grounding of the device.



Number of cabinets	Necessary accessory	Number of intake holes per cabinet (Ø 3 mm)
1	1 x Accessory intake pipe	**4**
2	2 x Extension set intake pipe	**4**
3	3 x Extension set intake pipe	**4**
4	4 x Extension set intake pipe	**3**
5	5 x Extension set intake pipe	**3**

7.6 Declaration of Conformity

Konformitätserklärung
Declaration of Conformity

Minimax Gerät für eine Brandmelde- und Löschsteueranlage
Minimax device for fire detection and extinguishing control system

Gegenstand / Typ: DET-AC Plus Aktivlöschsystem, DET-AC Plus Slave, EFD Plus
Subject / Type: DET-AC Plus Active Extinguishing System

Zum Einsatz in Brandmelde- und Löschsteueranlagen.
For use in fire detection and extinguishing control systems.

Das/Die vorgenannten Bauteile entsprechen in der gelieferten Ausführung den im Folgenden genannten einschlägigen Bestimmungen:
The above mentioned units corresponds in the delivered condition to the relevant regulations:

Angewandte EG Richtlinie: Applied EC-Directives:	Elektromagnetische Verträglichkeit 2004/108/EG Electromagnetic compatibility 2004/108/EC
Angewandte harmonisierte Normen: Applied harmonized standards:	EN 61000-3-3, EN 55022 Kl B, EN 61000-3-2, EN 50130-4
Angewandte EG Richtlinie: Applied EC-Directives:	Niederspannung 2006/95/EG Low Voltage 2006/85/EC
Angewandte harmonisierte Normen: Applied harmonized standards:	EN 60950, EN 60950/A11
Angewandte EG Richtlinie: Applied EC-Directives:	RoHS 2002/95/EC

Es sind keine anderen als die oben beschriebenen Anwendungen im Rahmen der technischen Spezifikationen und unter Beachtung aller einschlägigen Errichterbestimmungen zulässig.
No other than the above described use within the scope of the technical specifications and paying attention to all safety regulations for erection is permitted.
Schnittstellen zu Anlagen und Systemen, die in den Geltungsbereich anderer als obengenannter europäischer Regelwerke fallen, sind ggf. gesondert zu berücksichtigen.
Interfaces to systems, which are under the scope of other than above mentioned European rules must be specially considered if needed be.
Die Produkte der Minimax GmbH & Co. KG erfüllen alle Anforderungen des durch den VdS zertifizierten QM-Systems gemäß DIN EN ISO 9001
The products of the Minimax GmbH & Co. KG comply with all requirements of VdS certified QM-system acc. to DIN EN ISO 9001

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

Art.-Nr.: 907313 Äi 01

Bad Oldesloe, den 20.12.2007

Minimax GmbH & Co. KG Leiter Qualitätswesen
Minimax GmbH & Co. KG Quality Management

Dipl.-Ing. Thomas Jegodtka

Minimax GmbH & Co. KG Produkt Linien Manager Brandmeldeanlagen
Minimax GmbH & Co. KG Product Line Manager Fire Detection Systems

Dipl.-Ing. André Lickefett

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Unsere Steuer-Nr.: 30 289 45306

Geschäftsführer:
Klaus Hofmann (Vorsitzender)
Dr. Volker Bechtloff
Wolfgang Hartwig
Vorsitzender des Aufsichtsrats:
Dr. Dietrich Rümker

HypoVereinsbank AG, Hamburg
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IBAN DE61 2003 0000 0004 0071 61
SWIFT-BIC: HYVEDEMM300

Deutsche Bank AG
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IBAN DE46 2307 0710 0182 0430 00
SWIFT-BIC DEUTDEHH222

West LB AG, Düsseldorf
BLZ 300 500 00 Kto.-Nr. 135 1618
IBAN: DE30 3005 0000 0001 3516 18
SWIFT-BIC: WELADEDD

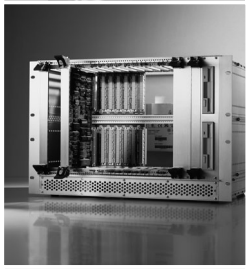
Dresdner Bank AG
BLZ 230 800 40 Kto.-Nr. 3111 29500
IBAN DE15 2308 0040 0311 1295 00
SWIFT-BIC DRESDEFF230

Notes

Notes

Schaltschrank-Systeme
Industrial Enclosures
Coffrets et armoires électriques
Kastsystemen
Apparatskåpssystem
Armadi per quadri di comando
Sistemas de armarios
インダストリアル エンクロージャー

Stromverteilung
Power Distribution
Distribution de courant
Stroomverdeling
Strömfördelning
Distribuzione di corrente
Distribución de corriente
分電・配電システム



Elektronik-Aufbau-Systeme
Electronic Packaging
Electronique
Electronic Packaging Systems
Electronic Packaging
Contenitori per elettronica
Sistemas para la electrónica
エレクトロニクス パッケージシステム

System-Klimatisierung
System Climate Control
Climatisation
Systeemklimatisering
Systemklimatisering
Soluzioni di climatizzazione
Climatización de sistemas
温度管理システム

IT-Solutions
IT Solutions
Solutions IT
IT-Solutions
IT-lösningar
Soluzioni per IT
Soluciones TI
ITソリューション

Communication Systems
Communication Systems
Armoires outdoor
Outdoor-behuizingen
Communication Systems
Soluzioni outdoor
Sistemas de comunicación
コミュニケーションシステム

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