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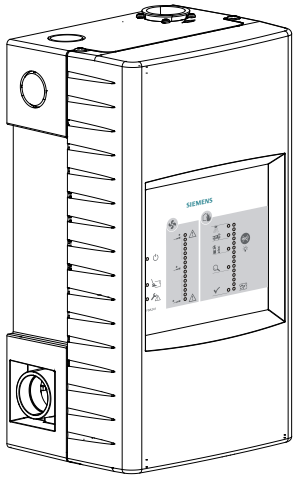

FDA241, FDA221

Aspirating Smoke Detector

Technical Manual

A6V10334410_h_en_--
2015-09-29

Building Technologies
Control Products and Systems

Legal notice

Technical specifications and availability subject to change without notice.

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Table of contents

1 About this document

Goal and purpose

This document contains all the information you'll need about the following aspirating smoke detectors:

- FDA241
- FDA221

Following the instructions consistently will ensure that the product can be used safely and without any problems.

Intended use

Aspirating smoke detectors FDA241 and FDA221 may only be used for fire detection and fire control purposes.

Target groups

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

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

Source language and reference document

- The source/original language of this document is German (de).
- The reference version of this document is the international version in English. The international version is not localized.

Document identification

The document ID is structured as follows:

ID code	Examples
ID_ModificationIndex_Language_COUNTRY -- = multilingual or international	A6V10215123_a_de_DE A6V10215123_a_en_-- A6V10315123_a_--_--

Date format

The date format in the document corresponds to the recommendation of international standard ISO 8601 (format YYYY-MM-DD).

Conventions for text marking

Markups

Special markups are shown in this document as follows:

▷	Requirement for a behavior instruction
1. 2.	Behavior instruction with at least two operation sequences
–	Version, option, or detailed information for a behavior instruction
⇨	Intermediate result of a behavior instruction
⇨	End result of a behavior instruction
●	Numbered lists and behavior instructions with an operation sequence
[→ X]	Reference to a page number
'Text'	Quotation, reproduced identically
<Key>	Identification of keys
>	In addition to relation symbols and for identification between steps in a sequence, e.g., 'Menu bar' > 'Help' > 'Help topics'
↑ Text	Identification of a glossary entry

Supplementary information and tips

The 'i' symbol identifies supplementary information and tips for an easier way of working.

1.1 Applicable documents

Document ID	Title
001508	Guidelines Connection factors, line resistances and capacitances for fire detection systems collective, AnalogPLUS, interactive, FDnet
007023	Technical manual Input module, input/output module FDCI222, FDCIO222, FDCIO224
007227	Technical manual Detector exchanger and tester FDUD292
008250	Technical Manual Line tester FDUL221
008331	List of compatibility (for 'Sinteso™' product line)
009052	FS20 Fire detection system - Commissioning, Maintenance, Troubleshooting
009078	FS20 Fire detection system - Configuration
009718	Technical Manual Intelligent detector tester FDUD293
A6V10210416	FS720 Fire detection system - Commissioning, Maintenance, Troubleshooting
A6V10210424	FS720 Fire detection system - Configuration
A6V10229261	List of compatibility (for 'Cerberus™ PRO' product line)
A6V10331032	Data sheet Aspirating Smoke Detectors FDA221, FDA241
A6V10332759	Installation, Operation Manual, Configuration 'ASD Configuration Tool FXS2051'
A6V10334435	Planning, Installation ASD Pipe system
A6V10340094	User Manual 'ASD Asyst Tool FXS2055'
A6V10344957	Installation Manual for 'FXS2055 ASD Asyst Tool'
A6V10345654	Installiotion, Mounting Aspirating Smoke Detectors FDA241, FDA221
A6V10348930	Driver Installer and Uninstaller for TUSB3410 based devices
A6V10367668	Open-Source Software (OSS) Licenses ASD
A6V10387338	Open-Source Software (OSS) Licenses ASD
A6V10388922	Open-Source Software (OSS) Licenses TUSB3410
A6V10393194	Technical manual Power supply kit A 70 W FP120-Z1
A6V10448753	Data sheet Remote test system for aspirating smoke detectors (ASD)

1.2 Download center

You can download various types of documents, such as data sheets, installation instructions, and license texts via the following Internet address:

http://siemens.com/bt/download

- Enter the document ID in the 'Find by keyword' input box.

You will also find information about search variants and links to mobile applications (apps) for various systems on the home page.

1.3 Technical terms

Term	Explanation
ABS	Acrylonitrile-butadiene-styrene (plastic)
ASD	Aspirating smoke detector
FDnet/C-NET	Addressed detector line
GPI	General Purpose Input, connection for an external switch
MC link	Maintenance and commissioning link
n.c.	normally closed (standard state of connection is closed)
n.o.	normally open (standard state of connection is open)
PC	Personal computer
PC	Polycarbonate (plastic)
PSU	**P**ower **s**upply **u**nit
SRC1	Optical detection channel in the FDnet/C-NET
SRC3	Channel for monitoring the airflow in the FDnet/C-NET

1.4 Revision history

The reference document's version applies to all languages into which the reference document is translated.

The first edition of a language version or a country variant may, for example, be version 'd' instead of 'a' if the reference document is already this version.

The table below shows this document's revision history:

Modification index	Edition date	Brief description
h	2015-09-29	**New firmware version 3.10 taken into account** **New chapters:** 'Connection to input/output module' **Amended chapters:** 'About this document' ('Intended use' section added); 'Applicable documents'; 'Operation on addressed detector line' ('Selection of settings' > 'Smoke alarm delay time'); 'Testing the airflow' ('Large deviations in the airflow'); 'Power supply'; 'Normalization'; 'Table of faults'; ' 'Dust' relay output for dust value (FDA241 only)'; 'Technical data FDA241, FDA221'
g	2015-03-03	Data sheet 'Remote test system for aspirating smoke detectors' added in 'Applicable documents' chapter. 'Technical data FDA241, FDA221' chapter amended and supplemented. Power supply kit FP120-Z1 added. Battery FA2003-A1 added. Detector can also be installed horizontally. Editorial changes
f	2014-06-25	Data sheet updated in 'Applicable documents' chapter. Editorial changes New chapter with reference to download center added
e	2013-07-02	Change of function when opening housing cover.
d	2012-11-02	Planning limits adapted. Additional references to license document and commissioning on the detector line. Information added about commissioning and maintenance. Change to date format in line with ISO 8601 specifications (yyyy-mm-dd format).
c	2012-03	Document adapted to the following type designation: communication transponder FDCC221S. Additional information on blowing-out unit. Technical data and mounting notes added. Additional notes on test mode and about commissioning on the detector line.
b	2011-12	Revised version
a	2011-10	First edition

The language versions and country variants produced by a local company have the same modification index as the corresponding reference document. They are not however included in the table below.

The table below shows the published language versions and country variants with the corresponding modification index:

Modification index	en_--	de_--	fr_--	it_--	es_--
h	X	X	X	X	X
g	X	X	X	X	X
f	–	X	–	–	–
e	X	X	X	X	X
d	X	X	–	–	–
c	-	X	–	–	–
b	-	X	–	–	–
a	X	X	–	–	–

X = published
– = no publication with this modification index

2 Safety

2.1 Safety instructions

The safety notices must be observed in order to protect people and property.

The safety notices in this document contain the following elements:

- Symbol for danger
- Signal word
- Nature and origin of the danger
- Consequences if the danger occurs
- Measures or prohibitions for danger avoidance

Symbol for danger

	This is the symbol for danger. It warns of **risks of injury**. Follow all measures identified by this symbol to avoid injury or death.

Additional danger symbols

These symbols indicate general dangers, the type of danger or possible consequences, measures and prohibitions, examples of which are shown in the following table:

 General danger

 Explosive atmosphere

 Voltage/electric shock

 Laser light

 Battery

 Heat

Signal word

The signal word classifies the danger as defined in the following table:

Signal word	Danger level
DANGER	DANGER identifies a dangerous situation, which **will result directly in death or serious injury** if you do not avoid this situation.
WARNING	WARNING identifies a dangerous situation, which **may result in death or serious injury** if you do not avoid this situation.
CAUTION	CAUTION identifies a dangerous situation, which could result in **slight to moderately serious injury** if you do not avoid this situation.
NOTICE	*NOTICE* identifies possible damage to property that may result from non-observance.

How risk of injury is presented

Information about the risk of injury is shown as follows:

	⚠ WARNING
	Nature and origin of the danger Consequences if the danger occurs • Measures / prohibitions for danger avoidance

How possible damage to property is presented

Information about possible damage to property is shown as follows:

	*NOTICE*
	Nature and origin of the danger Consequences if the danger occurs • Measures / prohibitions for danger avoidance

2.2 Safety regulations for the method of operation

National standards, regulations and legislation

Siemens products are developed and produced in compliance with the relevant European and international safety standards. Should additional national or local safety standards or legislation concerning the planning, mounting, installation, operation or disposal of the product apply at the place of operation, then these must also be taken into account together with the safety regulations in the product documentation.

Electrical installations

	⚠ WARNING
	Electrical voltage Electric shock • Work on electrical installations may only be carried out by qualified electricians or by instructed persons working under the guidance and supervision of a qualified electrician, in accordance with the electrotechnical regulations.

- Wherever possible disconnect products from the power supply when carrying out commissioning, maintenance or repair work on them.
- Lock volt-free areas to prevent them being switched back on again by mistake.
- Label the connection terminals with external external voltage using a 'DANGER External voltage' sign.
- Route mains connections to products separately and fuse them with their own, clearly marked fuse.
- Fit an easily accessible disconnecting device in accordance with IEC 60950-1 outside the installation.
- Produce earthing as stated in local safety regulations.

Mounting, installation, commissioning and maintenance

- If you require tools such as a ladder, these must be safe and must be intended for the work in hand.
- When starting the fire control panel ensure that unstable conditions cannot arise.
- Ensure that all points listed in the 'Testing the product operability' section below are observed.
- You may only set controls to normal function when the product operability has been completely tested and the system has been handed over to the customer.

Testing the product operability

- Prevent the remote transmission from triggering erroneously.
- If testing building installations or activating devices from third-party companies, you must collaborate with the people appointed.
- The activation of fire control installations for test purposes must not cause injury to anyone or damage to the building installations. The following instructions must be observed:
  - Use the correct potential for activation; this is generally the potential of the building installation.
  - Only check controls up to the interface (relay with blocking option).
  - Make sure that only the controls to be tested are activated.
- Inform people before testing the alarm devices and allow for possible panic responses.
- Inform people about any noise or mist which may be produced.
- Before testing the remote transmission, inform the corresponding alarm and fault signal receiving stations.

Modifications to the system design and the products

Modifications to the system and to individual products may lead to faults, malfunctioning and safety risks. Written confirmation must be obtained from Siemens and the corresponding safety bodies for modifications or additions.

Modules and spare parts

- Components and spare parts must comply with the technical specifications defined by Siemens. Only use products specified or recommended by Siemens.
- Only use fuses with the specified fuse characteristics.
- Wrong battery types and improper battery changing lead to a risk of explosion. Only use the same battery type or an equivalent battery type recommended by Siemens.
- Batteries must be disposed of in an environmentally friendly manner. Observe national guidelines and regulations.

Disregard of the safety regulations

Before they are delivered, Siemens products are tested to ensure they function correctly when used properly. Siemens disclaims all liability for damage or injuries caused by the incorrect application of the instructions or the disregard of danger warnings contained in the documentation. This applies in particular to the following damage:

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

2.3 Standards and directives complied with

A list of the standards and directives complied with is available from your Siemens contact.

2.4 Release Notes

Limitations to the configuration or use of devices in a fire detection installation with a particular firmware version are possible.

⚠ WARNING

Limited or non-existent fire detection

Personal injury and damage to property in the event of a fire.

- Read the 'Release Notes' before you plan and/or configure a fire detection installation.
- Read the 'Release Notes' before you carry out a firmware update to a fire detection installation.

!

NOTICE

Incorrect planning and/or configuration

Important standards and specifications are not satisfied.

Fire detection installation is not accepted for commissioning.

Additional expense resulting from necessary new planning and/or configuration.

- Read the 'Release Notes' before you plan and/or configure a fire detection installation.
- Read the 'Release Notes' before you carry out a firmware update to a fire detection installation.

3 Structure and function

3.1 Overview

Aspirating smoke detectors are used for early detection of smoke-generating fires in rooms and equipment. They are especially suited to applications in which point detectors are pushed to their limits, cannot be used or can only be used with restrictions.

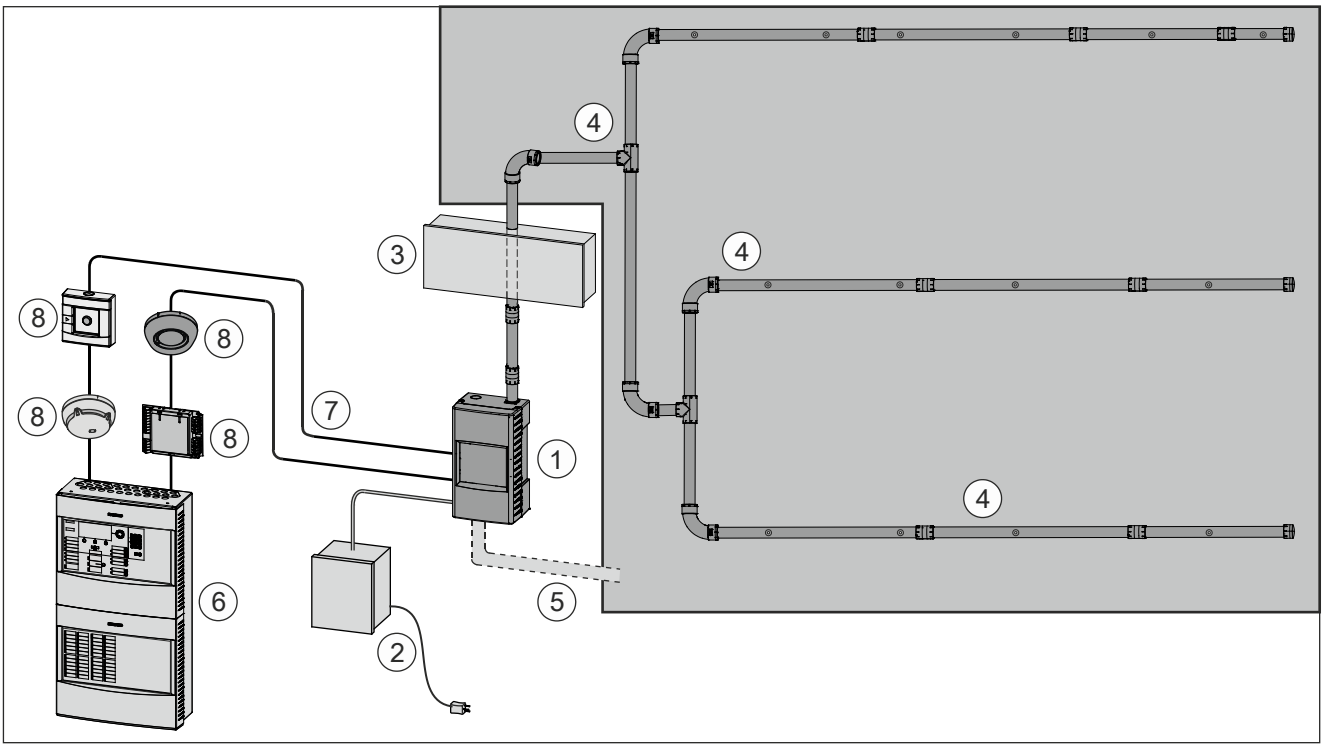
The aspirating smoke detector continually takes air from the monitored room using a connected pipe system with defined aspirating holes. The air is supplied to the detection chamber and is analyzed for smoke particles using the detector installed there. The sensitivity of the detector can be adjusted.

The position and size of the aspirating holes are calculated with the 'FXS2055 ASD Asyst Tool' software. The calculation ensures that the air passes from the aspirating hole to the detector in the time specified and with the required calculated sensitivity.

Examples of application

- Cavities such as false ceilings or false floors
- Rooms with polluted air, in which the pollution has impaired the performance of optical point detectors
- Clean rooms
- Rooms the height of which is greater than that permitted for point detectors
- Rooms with electromagnetic fields which influence the function of point detectors
- Large rooms up to 800 m²
- Separate monitoring of control cabinets and electronics cabinets
- Data centers
- Telecommunication centers
- Mounting lines
- Cable tunnels
- Conveyor belts

The aspirating smoke detector can be operated on an FDnet/C-NET detector line. For this purpose, communication transponder FDCC221S is also required:

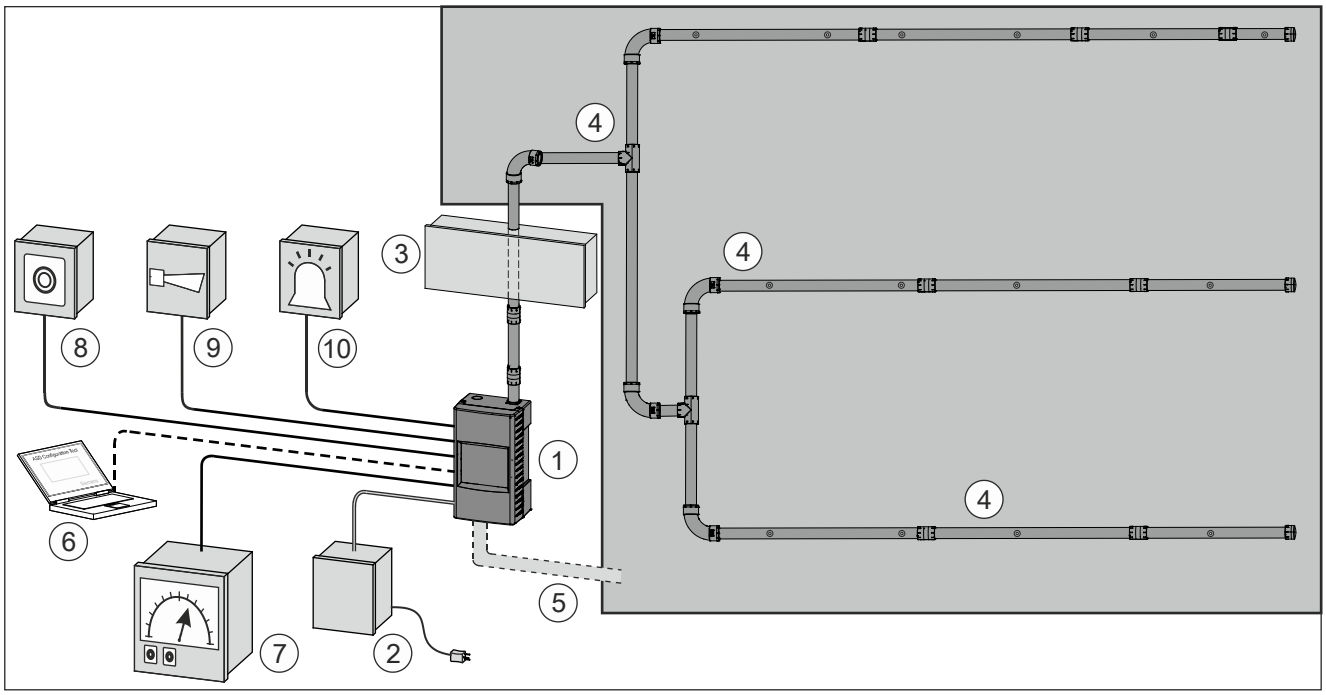


Aspirating smoke detector on addressed detector line

1 Aspirating smoke detector with communication transponder FDCC221S
2 External power unit with battery
3 Blowing-out unit (optional)
4 Pipe system
5 Return line (optional)
6 Fire control panel FC20xx/FC72x
7 FDnet/C-NET detector line
8 FDnet/C-NET peripheral device

When the aspirating smoke detector is operated on a FDnet/C-NET detector line, the relay outputs are inactive.

Alternatively, various external devices can be connected to the aspirating smoke detector in standalone operation [→ 37]:



Aspirating smoke detector in standalone operation

1 Aspirating smoke detector
2 External power unit with battery
3 Blowing-out unit (optional)
4 Pipe system
5 Return line (optional)
6 PC with 'FXS2051 ASD Configuration Tool' software
7 External control/indicator (optional)
8 External button (optional)
9 External acoustic signal equipment (optional)
10 External optical signal equipment (optional)

Properties

- Patented technology
- Can be used with Siemens FDnet/C-NET loop (with optional FDCC221S installed)
- Extended optical detection thanks to dual wavelengths (blue and infrared)
- Configuration via USB or FDCC221S (option)
- 'Out-of-the-box' installation and commissioning
- Early detection of a wider spectrum of particle sizes in the air
- Software 'FXS2055 ASD Asyst Tool' and pipe configuration supported
- Programmable alarm thresholds
- Unique dust-resistant detection chamber
- Intuitive front indicator for airflow and smoke value
- Normalization of the smoke value
- Normalization of the airflow
- Access to service functions
- Different event protocols
- Offline/online configuration supported
- FDA241, monitoring area of up to 800 m²
- FDA221, monitoring area of up to 500 m²
- 4…20 mA output
- Cleaning function (with FDA241 only)
- Firmware can be updated locally

3.1.1 Details for ordering

Type	Order no.	Designation
FDA241	S54333-F17-A1	Aspirating smoke detector (8H)
FDA221	S54333-F15-A1	Aspirating smoke detector (5S)

3.1.2 Product version ES

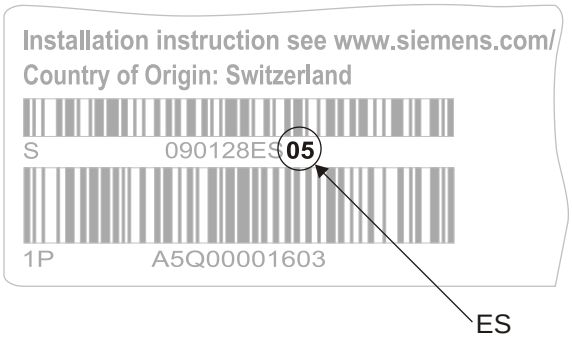
The product version ES provides the technical status of a device in terms of software and hardware. The product version is provided as a two-digit number.

You will find the details of your device's product version:

- On the packaging label
- On the product label or the type plate

Product version on the packaging label

Details of the product version can be found directly on the packaging label in the barcode:



Example of a packaging label with details of the product version

Product version on the product label and the type plate

Details of the product version can be found after the device order number:

Example of a product label with details of the product version

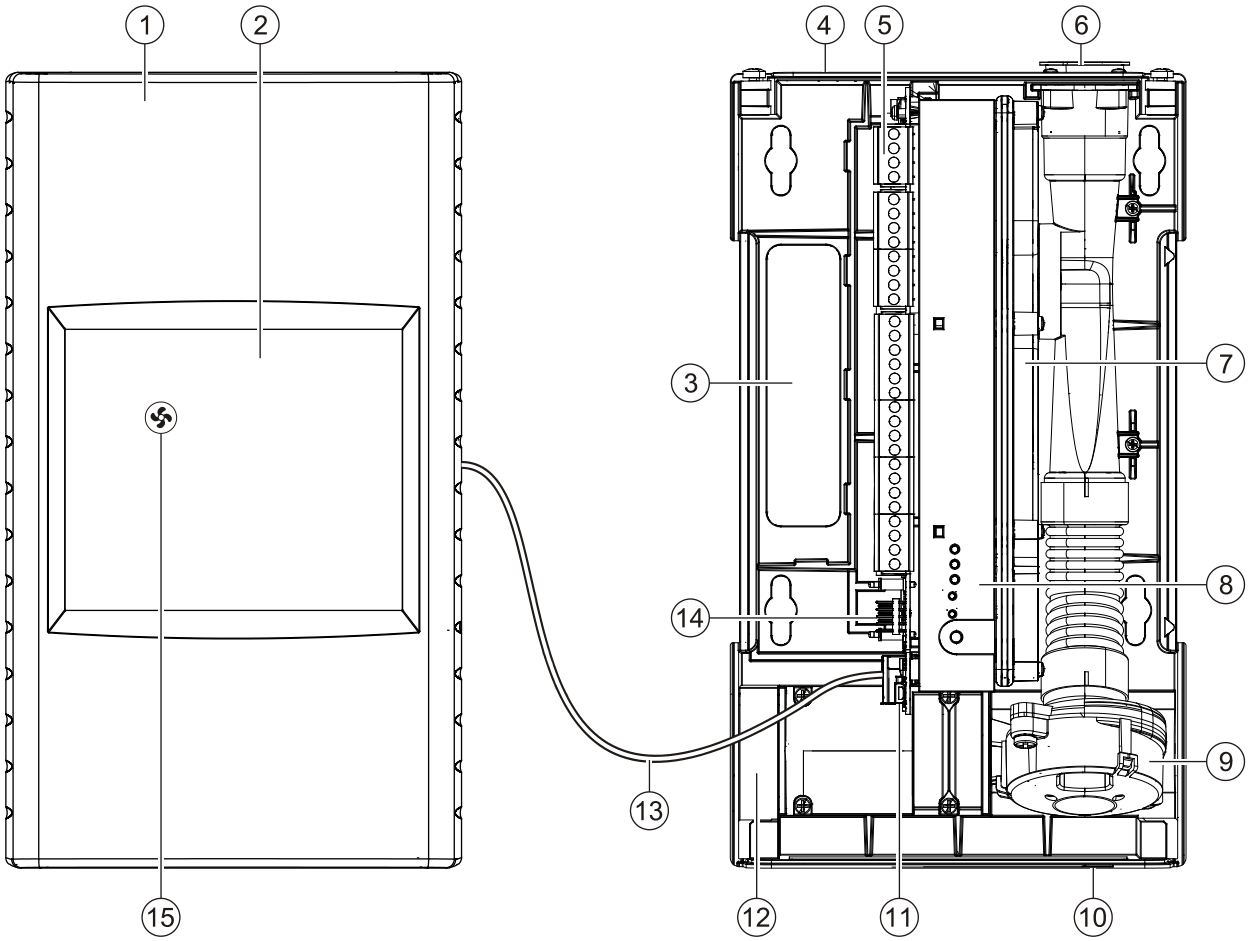
Depending on the product and various approvals, the product labels may differ in terms of the information type and layout.

Look for your device's order number on the product label.

You will find the product version after the order number.

3.2 Setup

Components



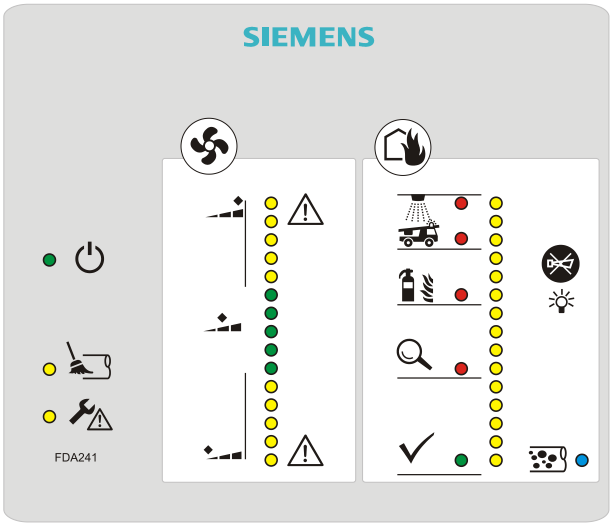
Overview

Position	Part	Function
1	Housing cover	-
2	Front indicator	Operating indicators and fault indicators, connected to the interface card by a cable
3	Opening	Cable entry
4	Back box	Wall mounting with screws
5	Interface card	Connections to external devices and signal equipment. Depending on the version of the aspirating smoke detector, not all connections are available. If the aspirating smoke detector is operated on a FDnet/C-NET detector line, certain outputs are not active. See the chapter 'Function [→ 34]'.
6	Air inlet	Pipe system connection
7	Detection chamber	Smoke sensor with flow monitoring
8	Internal indicator	Alarm indicator, activate normalization
9	Aspiration unit	Fan for aspirating the air.
10	Type plate	Relevant identification and detector data

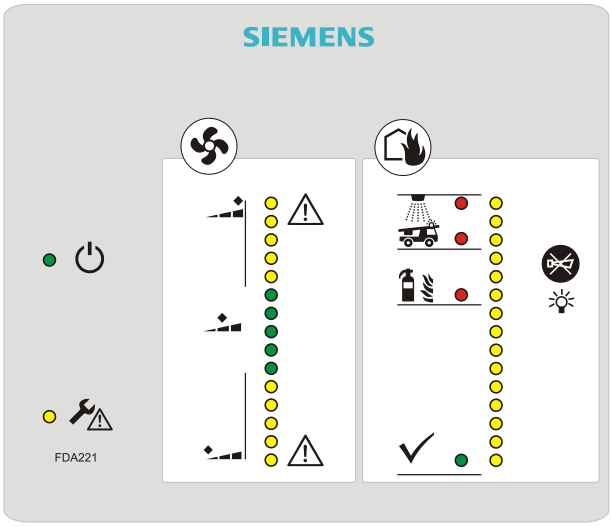
Position	Part	Function
11	Mini USB connection for PC	Interface for configuring the aspirating smoke detector using the 'FXS2051 ASD Configuration Tool' software
12	Air outlet	Air outlet in the room or return line connection
13	Cables	Connection to the front indicator
14	Contact pins	Connection for communication transponder FDCC221S
15	Buzzer	Signal tone output

3.2.1 Front indicator

The front indicator on the housing cover provides a quick overview of the aspirating smoke detector's current status using LED indicators. The buzzer can be switched off and a function test for LEDs and buzzers activated using a button.



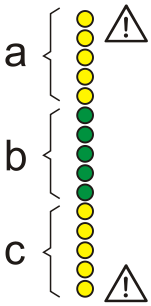
Front indicator FDA241

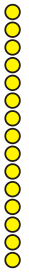
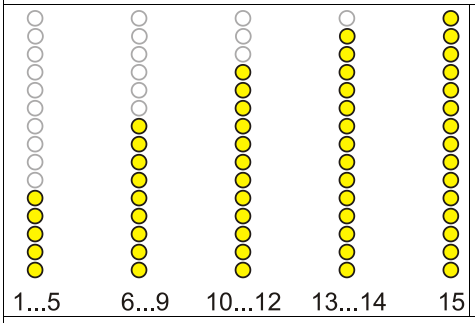


Front indicator FDA221

The front indicator can be rotated 180° in the housing cover if necessary. See 'Adapting the front indicator to the installation position [→ 58]'.

Display	Designation	Function
	Operating indication	The green LED lights up permanently: ● When the power supply is connected
	Blowing-out indicator [1]	The yellow LED lights up permanently: ● When the blowing-out process is activated The yellow LED flashes: ● Once the blowing-out process has been activated until the normal operating status is achieved (lasts up to 2 minutes)
	Indication of faults	The yellow LED flashes: ● When there is a technical fault ● When the housing cover is opened

	Airflow indicator	The current airflow is indicated by an LED in the airflow indicator (bar graph indicator).
	a) LED yellow 	If a yellow LED lights up, the airflow has increased. ● As the deviation increases, the light moves upwards. If the topmost LED flashes, the airflow has exceeded the upper limit and the alarm delay time has expired. Example: There may be a leak in the pipe system.
	b) LED green 	One of the green LEDs lights up. The airflow is normal.
	c) LED yellow 	If a yellow LED lights up, the airflow is too low. ● As the deviation increases, the indicator moves downwards. If the bottommost LED flashes, the airflow has fallen below the lower limit and the alarm delay time has expired. Example: Some of the aspirating holes in the pipe system may be blocked.

	Alarming indicator	The aspirating smoke detector's current alarm status is indicated by LEDs in the smoke indicator (bar graph indicator).
 Yellow LED	Smoke indicator	**Number of LEDs lighting up and their meaning**  1...5 6...9 10...12 13...14 15 1…5 'Smoke low' 6…9 'Inspect' 10…12 'Prealarm' 13…14 'Fire 1' 15 'Fire 2'
 Green LED	Alarm level	The green LED lights up if the level of smoke is minimal. At the same time, the bottommost 1 to 5 yellow LEDs may indicate minor deviations.
 Red LED	Alarm level [1] Inspect	The red LED lights up at the 'Inspect' alarm level. At the same time, the bottommost 6 to 9 yellow LEDs light up.
 Red LED	Alarm level Prealarm	The red LED lights up at the 'Prealarm' alarm level. At the same time, the bottommost 10 to 12 yellow LEDs light up.
 Red LED	Alarm level Fire 1	The red LED lights up at the 'Fire 1' alarm level. At the same time, the bottommost 13 to 14 yellow LEDs light up.
 Red LED	Alarm level Fire 2	The red LED lights up at the 'Fire 2' alarm level. At the same time, the 15 yellow LEDs light up.

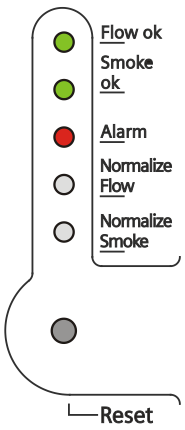
	Button	**Action**	**Consequence**
		Press the button briefly	The buzzer switches off
		Press and hold the button (approx. 5 s)	A signal test/fault analysis is activated.
		When the housing cover is open, the button takes on the function of the reset button and the alarm outputs are deactivated. See the chapter 'Internal indicator [→ 28]'.	
		Press the button briefly	The buzzer switches off. The relay outputs are deactivated. The 4…20 mA analog output remains on fault.
	Dust indicator [1]	Flashing becomes more frequent as the dust density increases.	
		LED status	**Meaning**
		Off	Normal operation
		Slow flashing	Low dust value
		Fast flashing	Medium dust value
		Permanently on	High dust value

[1] FDA241 only

3.2.2 Internal indicator

When the housing cover [→ 46] is open, the internal indicator is accessible. The internal indicator performs the following functions:

- Status display for airflow, smoke value, and alarm using 3 LEDs
- Activate or stop normalization of the airflow using a button
- Activate or stop normalization of the smoke value using a button
- Reset self-retaining status displays and relay outputs using a button



Internal indicator

Indication	Designation	Function
Flow ok	Flow ok	The green LED flashes when the airflow is normal.
Smoke ok	Smoke ok	The green LED flashes when the smoke value is low.
Alarm	Alarm	The red LED flashes during an alarm.

Button	Designation	Function
Normalize Flow	Normalize Flow	Button for activating or stopping normalization of the airflow.
Normalize Smoke	Normalize Smoke	Button for activating or stopping normalization of the smoke value.
Reset	Reset	Button for resetting the self-retaining status displays and relay outputs. The current detector status is reset.

The 'Normalize Flow' and 'Normalize Smoke' buttons can only be actuated using a suitable, thin tool, e.g. a pen or a paper clip.

3.2.3 Interface card

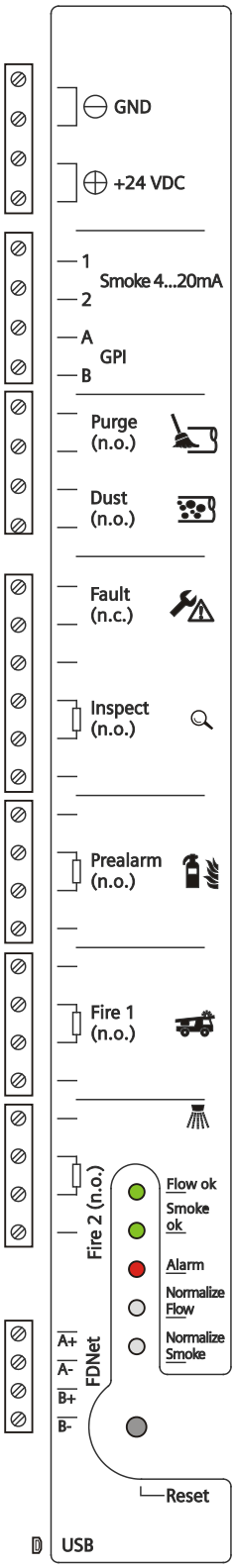
The interface card in the back box is accessible once the housing cover has been removed.

You can do the following on the interface card:

- Establish the cable connection to the front display in the housing cover
- Connect the external power supply for the aspirating smoke detector
- Control various external functions via relays
- Install communication transponder FDCC221S (accessory)
- Establish a connection to a PC using the mini USB interface

The graphic below provides an overview of the connections together with the associated symbols and labels.

The connection terminals are combined in functional units.



Power supply
You will find details on page [→ 64].

'Smoke 4…20 mA' analog output. You will find details on page [→ 66].

Configurable **'GPI'** input
You will find details on page [→ 68].

'Purge' relay output for blowing out (with FDA241 only)
You will find details on page [→ 68].

'Dust' relay output for dust value (with FDA241 only). You will find details on page [→ 69].

'Fault' relay output for error messages. You will find details on page [→ 69].

'Inspect' relay output for Inspect (with FDA241 only)
You will find details on page [→ 69].

'Prealarm' relay output for Prealarm
You will find details on page [→ 70].

'Fire 1' relay output for Fire 1
You will find details on page [→ 70].

'Fire 2' relay output for Fire 2
You will find details on page [→ 70].

'FDNet' relay connection with FDCC221S (optional)
You will find details on page [→ 66].

'USB' Mini USB port for connecting to a PC
You will find details on page [→ 94].

See also

- Communication transponder FDCC221S [→ 37]
- External power unit and batteries [→ 31]
- Removing and installing the housing cover when the power supply is switched on [→ 51]

3.2.4 External power unit and batteries

External power unit

The aspirating smoke detector must be supplied with electricity by an external power unit. The power unit must satisfy the following requirements:

- Version according to EN 54-4
- Output voltage: DC 24 V
- Output current: 250 mA
- The power unit must be connected to the aspirating smoke detector with as short a cable as possible.
- Suitable power unit:

Company	Type	VdS	For battery type
Siemens	FP120-Z1	G214130	2x FA2003-A1 (12 V, 7 Ah) Or 2x FA2004-A1 (12 V, 12 Ah) Or 2x FA2005-A1 (12 V, 17 Ah)

You will find more information on the power supply kit FP120-Z1 in document A6V10393194. See the 'Applicable documents [→ 9]' chapter.

Batteries

If the power supply via the external power unit fails, the power supply of the aspirating smoke detector must be guaranteed using batteries.

- If the aspirating smoke detector is in standalone operation: Observe local regulations for the minimum detector operation period for power supply failure. The capacity of the batteries must be selected according to the local regulations.
- If the aspirating smoke detector is being operated on a FDnet/C-NET detector line: The capacity of the batteries must match the runtime of the connected fire detection installation if the power supply fails. Observe local regulations for the fire detection installation.
- The batteries are charged using the external power unit. The charging current for the batteries depends on the battery capacity. You should therefore select your external power unit to match the batteries' capacity.

See also

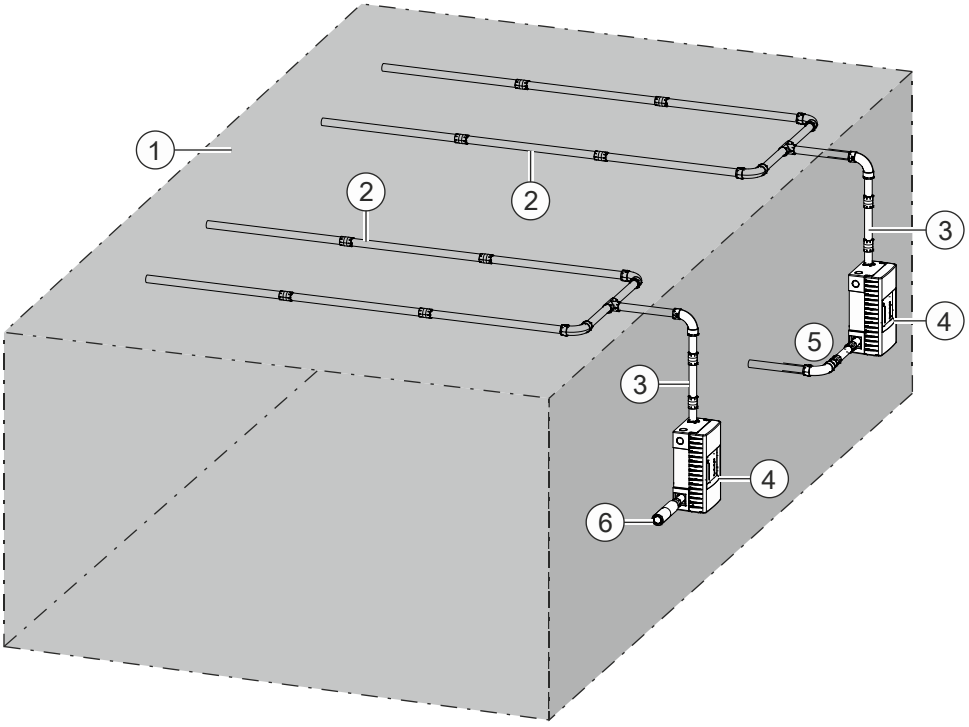
- Determining the batteries [→ 42]
- Battery FA2003-A1 (12 V, 7 Ah, VdS) [→ 38]
- Battery FA2004-A1 (12 V, 12 Ah, VdS) [→ 38]
- Battery FA2005-A1 (12 V, 17 Ah, VdS) [→ 38]
- Power supply kit A (70 W) FP120-Z1 [→ 37]
- Power supply [→ 41]

3.3 Pipe system

The pipe system must be designed according to the calculation with the 'FXS2055 ASD Asyst Tool' software.

The components used for the pipe system must satisfy the requirements according to document A6V10334435. See 'Applicable documents [→ 9]'.

Example pipe system for air aspiration



Pipe system

1 Monitored room	4 Aspirating smoke detector
2 Pipes and fittings	5 Outlet line as return line (optional)
3 Hose	6 Outlet line (optional)

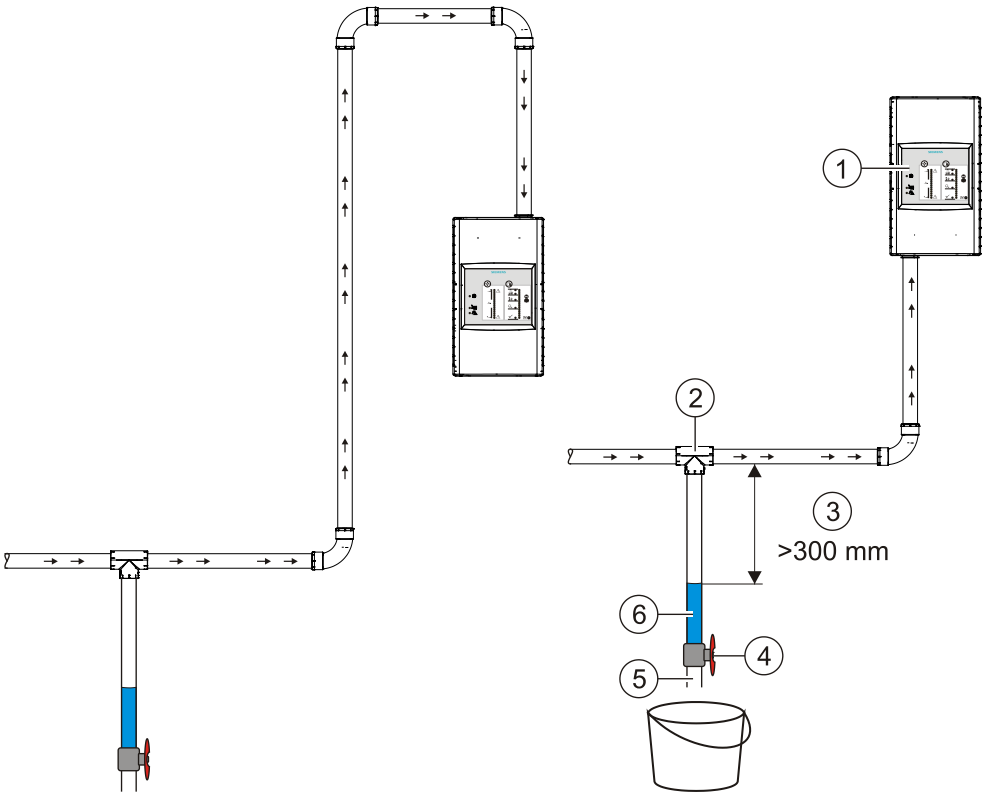
3.3.1 Water trap in the pipe system

In the case of highly variable ambient conditions where there is a risk of condensation water forming in the pipe system, a water trap must be used. The water trap collects the condensation water. The condensation water must be drained via a drain hole in the water trap.

The condensation water that has been collected must not enter the airflow and must be drained in good time.

Installation site requirements

- It must be easy to read the level of water in the water trap.
- It must be possible to access the water trap when full for the purpose of emptying it.
- The water trap must be installed at a horizontal point within the pipe system that is as low as possible. It must not be possible for water to accumulate at any other point.



Example of how to arrange a water trap

→→	Airflow		
1	Aspirating smoke detector with front indicator that is rotated by 180°	4	Valve for draining condensation water
2	T-fitting for connecting the water trap at a low horizontal point within the pipe system	5	Outlet opening
3	Distance between manifold and surface of the water > 300 mm	6	Condensation water

See also

Adapting the front indicator to the installation position [→ 58]

3.4 Parameter settings

Parameter sets can be used to select the sensitivity with a view to optimizing the aspirating smoke detector for the current application. You will find information about selection and application in the chapter 'Operating modes [→ 39]'.

3.5 Function

The aspirating smoke detector can be used on a FDnet/C-NET detector line or in standalone operation.

Comparison of the operating types

- When operating on a FDnet/C-NET detector line, configuration takes place using the software for the fire control panel.
  - For fire control panels FC20xx: 'SintesoWorks'
  - For fire control panels FC72x: 'Cerberus-Engineering-Tool'
- In standalone operation: Configuration with the 'FXS2051 ASD Configuration Tool' software

Controlling the relay outputs on the interface cards

The table below provides an overview of the controlled relay outputs when the aspirating smoke detector is being operated on an FDnet/C-NET detector line and in standalone operation:

Relay output	Operation on FDnet/C-NET detector line	Standalone operation
Purge	X	X
Dust	–	X
Fault	X	X
Infoalarm	–	X
Prealarm	–	X
Fire1	–	X
Fire2	–	X

X = control of relay output

– = no control of relay output

3.5.1 Function during operation on detector line

The information in this chapter only applies to applications in which a communication transponder FDCC221S (accessory) is installed in the aspirating smoke detector and the aspirating smoke detector is connected to a compatible fire control panel via the FDnet/C-NET.

3.5.1.1 Danger levels

The aspirating smoke detector can transmit the following danger levels to the fire control panel:

Symbol					
Danger level	_	1 [1]	2	3	3
Designation	_	Inspect	Prealarm	Fire 1	Fire 2
Configuration in the fire detection installation	_	Sensor 1			Sensor 2
Meaning	No danger	Possible danger	Warning	Alarm	Alarm and extinguishing Alarm level: Fire 2
Comment	Normal	Check situation	Possible danger	Fire	The highest danger level 3 has been reached and the conditions for activating extinguishing are satisfied.

[1] If danger level 1 is frequently transmitted, check whether another sensitivity setting is more suitable.

The evaluation of the danger level and the decisions to be taken (e.g. activation of remote transmission) are configured in the fire detection system.

3.5.1.2 Interface to service devices

A port with the MC link (maintenance and commissioning link) is installed on communication transponder FDCC221S.

Using this interface, it is possible to read data from the device with the 'FDUD292 detector exchanger and tester' or the 'FDUD293 intelligent detector tester'.

You will find more information in documents 007227 and 009718.

See also

Applicable documents [→ 9]

3.5.1.3 Test mode

For testing purposes the aspirating smoke detectors can be set to test mode. Test mode does the following:

- The relays are deactivated.
- The buzzer is operated at a lower sound level.

- The green operating indicator flashes.
- No changes are made to the sensitivity.

Electronic testing:

The aspirating smoke detectors can be tested on FC20xx/FC72x fire control panels (market package MP5.0/IP5 or higher) using detector exchanger and tester FDUD292 or intelligent detector tester FDUD293.

You will find more information in documents 007227 and 009718.

See also

Applicable documents [→ 9]

3.5.1.4 Renovation mode

When operating the point detectors on the FDnet/C-NET, individual detectors can be set specifically to renovation mode on the fire control panel.

Select renovation mode if major work is being carried out in the room and large volumes of dust or aerosols are being produced.

In renovation mode, the detector is operated with the least sensitive parameter set (no. 10).

See also

Parameter Sets [→ 40]

3.5.1.5 Line separator

Line separators are electronic switches which isolate the defective part in case of a short-circuit on the FDnet/C-NET detector line. The rest of the detector line remains serviceable. On a loop line all FDnet/C-NET devices remain fully functional after a simple error.

The function of the line separator is integrated in communication transponder FDCC221S.

See also

Communication transponder FDCC221S [→ 37]

3.5.1.6 Line tester FDUL221

The line tester FDUL221 detects aspirating smoke detectors on the FDnet/C-NET detector line.

You will find more information in document 008250.

See also

Applicable documents [→ 9]

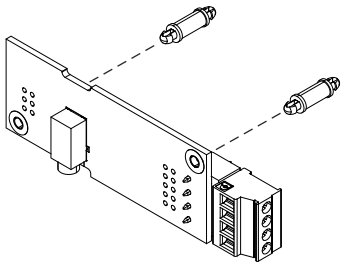
3.5.2 Standalone operation

A fire control panel is not essential to operate the aspirating smoke detector. Various functions can be directly controlled by the aspirating smoke detector. In the case of standalone operation, communication transponder FDCC221S must not be installed.

In standalone operation, the aspirating smoke detector is configured using a PC with the 'FXS2051 ASD Configuration Tool' software.

3.6 Accessories

3.6.1 Communication transponder FDCC221S

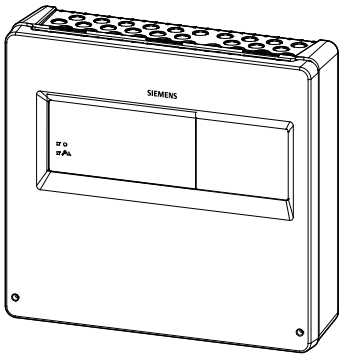


- For connecting the aspirating smoke detector to FDnet/C-NET
- Integrated 'line separator' function
- Additional MC line interface (port)
- Tool-free installation on an intended PCB slot
- Supplied with:
  - 2 spacer bolts
  - 4-pin terminal
  - ID adhesive label
- Compatible with:
  - Aspirating smoke detector FDA241
  - Aspirating smoke detector FDA221
- Order no.: S24218-A201-A2

See also

Installing communication transponder FDCC221S [→ 62]

3.6.2 Power supply kit A (70 W) FP120-Z1

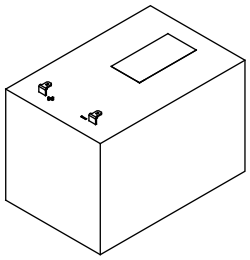


- For converting the mains voltage into system voltage
- For charging connected batteries
- For supplying devices according to EN 54-4
- Choice of input voltage between AC 115 V or AC 230 V
- Compatible with:
  - Battery FA2003-A1
  - Battery FA2004-A1
  - Battery FA2005-A1
- For details, see document A6V10393194
- Order no.: S4400-S122-A1

See also

External power unit and batteries [→ 31]

3.6.3 Battery FA2003-A1 (12 V, 7 Ah, VdS)

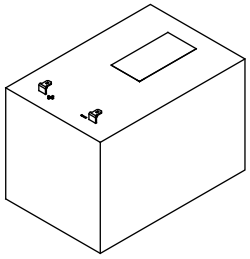


- For supplying fire control panels and aspirating smoke detectors with power
- Compatible with:
  - Fire control panels for the 'Sinteso' and 'Cerberus PRO' product lines
  - External power units for the aspirating smoke detectors FDA241 and FDA221
- VdS approval: G103032
- Order no.: A5Q00019353

See also

Determining the batteries [→ 42]

3.6.4 Battery FA2004-A1 (12 V, 12 Ah, VdS)

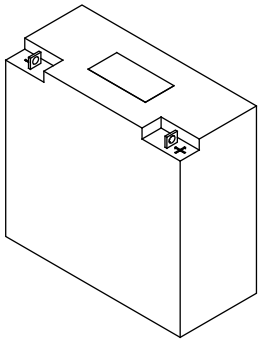


- For supplying fire control panels and aspirating smoke detectors with power
- Compatible with:
  - Fire control panels for the 'Sinteso' and 'Cerberus PRO' product lines
  - External power units for the aspirating smoke detectors FDA241 and FDA221
- VdS approval: G103034
- Order no.: A5Q00019354

See also

Determining the batteries [→ 42]

3.6.5 Battery FA2005-A1 (12 V, 17 Ah, VdS)



- For supplying fire control panels and aspirating smoke detectors with power
- Compatible with:
  - Fire control panels for the 'Sinteso' and 'Cerberus PRO' product lines
  - External power units for the aspirating smoke detectors FDA241 and FDA221
- VdS approval: G103035
- Order no.: A5Q00019677

See also

Determining the batteries [→ 42]

4 Planning

4.1 Compatibility

Compatible with fire control panels that support the FDnet/C-NET detector line.

You will find detailed information in the 'List of compatibility'.

The table below shows the compatibility of the aspirating smoke detectors and installed communication transponder FDCC221S with various fire control panels:

Detector line	Fire control panel			
	FC20xx	FC72x	SIGMASYS	AlgoRex
FDnet	X	–	–	–
C-NET	–	X	–	–

X = compatible

– = not compatible

Please also observe the documentation for your fire detection system.

See also

Applicable documents [→ 9]

4.2 Operating modes

Three different modes can be set.

'Automatic: switches between blue and blue-red based on ratio'

This mode is suitable for standard use. The sensitivity to small smoke particles is high and dust suppression is normal. The particle size is taken into account. This reduces the likelihood of a false alarm.

'Robust'

This mode is suitable for use in dirty rooms where there is a high dust load. The sensitivity to small smoke particles is lower, but this results in a higher level of dust suppression. This makes use possible in a dirty environment or in changing ambient conditions.

'Ultra sense: always blue'

This mode is suitable for use in clean rooms where there is a low dust load. The sensitivity to small smoke particles is very high and dust suppression is low. As a result, the detector is very sensitive even to minor changes relating to smoke or dust in the intake air.

Parameter sets can be used to make further settings with a view to fine-tuning the product for the installed pipe system. When making your selection, take the following into account:

- Ambient conditions
- Place of installation
- Usage conditions
- Alarm delay
- In the FDnet/C-NET, the operating mode and parameter sets can be configured from the fire control panel.
- To determine suitable parameters, use the recommendations from the 'FXS2055 A6V10340094' software.

4.2.1 Parameter Sets

The following information applies to the 'Automatic: switches between blue and blue-red based on ratio' mode.

FDA241

Set No.	Sensitivity [%/m]				Comment
	Inspect	Prealarm	Fire 1	Fire 2	
0	0.07	0.10	0.15	20	default
1	0.03	0.04	0.05	2	-
2	0.03	0.045	0.06	2.5	-
3	0.04	0.055	0.07	3	-
4	0.05	0.075	0.10	4	-
5	0.07	0.10	0.15	5	-
6	0.08	0.14	0.20	6	-
7	0.18	0.28	0.40	8	-
8	0.30	0.50	0.70	10	-
9	0.40	0.70	1.00	15	-
10	0.80	1.40	2.00	20	-

FDA221

Set no.	Sensitivity [%/m]			Comment
	Prealarm	Fire 1	Fire 2	
0	0.50	0.70	20	default
6	0.14	0.20	6	-
7	0.28	0.40	8	-
8	0.50	0.70	10	-
9	0.70	1.00	15	-
10	1.40	2.00	20	-

4.3 Power supply

The normal status and the alarm status must be taken into account when dimensioning the power supply. When the normal status applies, the power supply must provide the quiescent current for the smoke aspiration systems and ensure that the emergency batteries are charged in accordance with VDE 0883, Part 1. When the alarm status applies, additional power is required. Take this into account when dimensioning the batteries. The batteries must be designed to support a bridging time of 24 hours in the normal status and 1 hour in the alarm status.

You will find details of the aspirating smoke detector's current consumption in chapter 'Technical data for FDA241, FDA221 [→ 105]'.

Line calculation

The maximum length of the line is calculated on the basis of the permissible voltage drop on the supply line. The permissible voltage drop is the difference between the final voltage of the batteries (21.5 V) and the lower operating voltage limit of the smoke aspiration systems.

$$L_{max} = \frac{\Delta U}{I_{alarm} \cdot 2} \cdot \frac{A}{\gamma}$$

L_{max} = Maximum length of line in [m]

ΔU = Max. voltage drop on supply line

A = Wire cross-section in [mm²]

I_{alarm} = Maximum current of all aspirating smoke detectors in alarm status in [A]

γ = Specific resistance: Cu = 0.0175 Ω mm²/m

To ensure the housing remains properly sealed, select the relevant grommet for the cable concerned.

- M20 cable grommet: Ø 8…12 mm
- M25 cable grommet: Ø 9…14 mm

Also observe the notices in the 'Technical data for FDA241, FDA221 [→ 105]' chapter.

Capacity calculation

Use the following formula to calculate the nominal capacity of the batteries:

$$K_{nominal} = (I_{quiescent} \cdot t_1 + I_{alarm} \cdot t_2)\, n \cdot 1{,}25$$

$K_{nominal}$ = Nominal capacity of emergency battery in [Ah]

$I_{quiescent}$ = Quiescent current [A]

I_{alarm} = Maximum current of all aspirating smoke detectors in alarm status in [A]

n = Number of aspirating smoke detectors

t_1 = Required bridging time during operation in [h] (typically 24 h)

t_2 = Required bridging time in the case of an alarm in [h] (typically 1 h)

1.25 = The factor of 1.25 ceases to apply with bridging times of more than 24 hours.

See also

External power unit and batteries [→ 31]

4.4 Determining the batteries

If the aspirating smoke detector's power supply via the external power unit fails, power is supplied via batteries.

Determining the required battery type

The battery capacity depends on the following conditions:

- Buffer time required
- Battery age
- Country-specific specifications, as regulated in local regulations or European provisions
- The required battery capacity can be identified using the following calculations:

$$C_{Battery} = f \cdot [t_{Standby} \cdot (150\ mA + I_{PSU}) + t_{Alarm} \cdot (250\ mA + I_{PSU})]$$

$C_{Battery}$ = Battery capacity

f = Factor for the battery age

$t_{Standby}$ = Buffer time

I_{PSU} = Internal current of the power supply unit

t_{Alarm} = Alarm time

- To achieve the system voltage of DC 24 V, two batteries must be connected in series.
- The buffer times specified in the table apply in the case of an operating temperature within the range -5…45 °C.
- The batteries are charged using the external power unit. The charging current for the batteries depends on the battery capacity. You should therefore select your external power unit to match the batteries' capacity.

⚠ WARNING

Switching batteries in parallel

Risk of explosion and fire

- Never connect batteries in parallel!
- If you need more power, you must use batteries with a higher capacity.

See also

- Battery FA2003-A1 (12 V, 7 Ah, VdS) [→ 38]
- Battery FA2004-A1 (12 V, 12 Ah, VdS) [→ 38]
- Battery FA2005-A1 (12 V, 17 Ah, VdS) [→ 38]

4.5 Limits to planning

Observe local regulations and specifications for the limits of the detection range of the aspirating holes. The local regulations and specifications take priority over all other information in this document.

The following limits are set for planning the pipe system depending on the aspirating smoke detector used.

Single pipe

Detector	Sensitivity [%/m obs]	Monitored surface	I-topology	
			Length of pipe system	Number of aspirating holes (Class A)
FDA221	0.14…20	≤500 m²	≤30 m	≤12
FDA241	0.03…20	≤800 m²	≤60 m	≤16

Branched pipes (symmetrical and asymmetrical U-topology)

Detector	Sensitivity [%/m obs]	Monitored surface	U-topology	
			Length of pipe system	Number of aspirating holes
FDA221	0.14…20	≤500 m²	≤2x 25 m	≤24
FDA241	0.03…20	≤800 m²	≤2x 60 m	≤34

Detector	Sensitivity [%/m obs]	Monitored surface	Double U-topology	
			Length of pipe system	Number of aspirating holes
FDA241	0.03…20	≤800 m²	≤4x 30 m	≤34

Adherence to the planning limits is verified by the 'FXS2055 ASD Asyst Tool' software.

- The maximum number of aspirating holes depends on the sensitivity and whether it is a question of class A, B, or C. You will find these details in the 'FXS2055 ASD Asyst Tool' software (see also the table above).
- In rooms where there is an increased risk (rooms with ventilation systems), the size of the monitored area drops to 270…540 m² with the FDA241 (170…340 m² with the FDA221).

The maximum monitored area depends on the topology selected and the overall maximum pipe length.

See also

Technical data for FDA241, FDA221 [→ 105]

4.6 Environmental influences

If the devices are used in industrial applications, consultation with the project manager is required, since plastics do not withstand certain environmental conditions.

The following factors must be taken into consideration:

- Chemicals
- Temperature
- Moisture
- Fluctuations in air pressure, e.g. in well aerated rooms

4.7 Blowing-out unit

Deposits at the aspirating holes affect air aspiration and have the potential to trigger an alarm. The pipe system should be blown out to purge it. To do this, compressed air is introduced into the pipe system. The compressed air clears deposits from the aspirating holes and capillary tubes. The aspirating smoke detector features an output for the purpose of controlling a blowing-out unit.

Always ensure that the blowing-out unit used for blowing out is suitable.
Find out about any local regulations.

Blowing out unit requirements

- The blowing-out unit must be approved in accordance with local regulations.
- The aspirating smoke detector must not be subject to pressure.
  - No compressed air is permitted to enter the aspirating smoke detector during blowing out.
  - The blowing-out unit must feature suitable valves.
  - For blowing out purposes, it must be possible to disconnect the pipe system from the aspirating smoke detector.
- Once blowing out has been performed, it must be possible to reconnect the pipe system to the aspirating smoke detector.

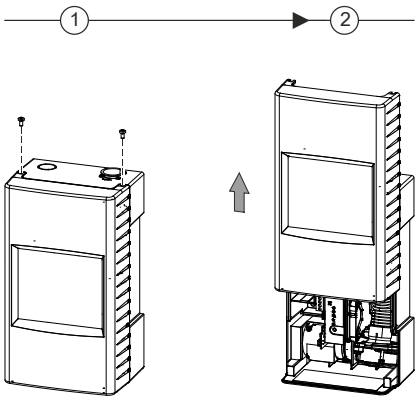
5 Mounting / Installation

5.1 Preparatory work

5.1.1 Opening and closing the housing cover when the power supply is switched off

When the housing cover is open, the mini USB connection and the internal indicators are accessible.

!	*NOTICE*
	Electrostatic discharge Damage to electronic components in the aspirating smoke detector • When working on the open aspirating smoke detector, use anti-static floor mats and anti-static work surfaces. • Ground yourself immediately before opening the housing, e.g. by touching a ground point or wearing an anti-static belt.



Opening the housing cover

Opening the housing cover

▷ The housing is free from dust.

1. Remove the two screws on the top of the aspirating smoke detector using a size 2 Phillips screwdriver (step 1).
2. Slide the housing cover in the direction of the arrow until it snaps into place (step 2).

⇨ The housing cover is open.

Closing the housing cover

▷ The size 2 Phillips screwdriver and the two screws are available.

▷ The power supply is switched off.

1. Slide the housing cover in the opposite direction to the arrow (step 2) until it reaches the end position at the bottom.
2. **NOTICE! Connection cable clamped between the back box and the housing cover. Damage to the cable! Be aware of the connection cable when closing the housing cover.**
3. Screw the housing cover to the housing base with the two screws. Tighten the screws by hand (step 1).

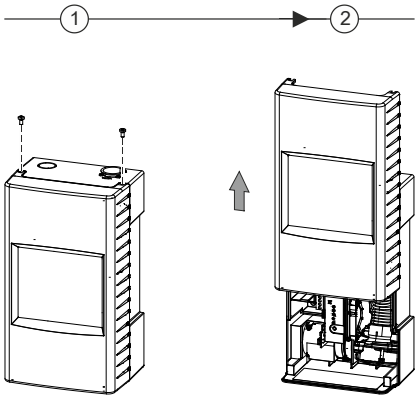
⇨ The housing cover is closed.

5.1.2 Opening and closing the housing cover when the power supply is switched on

When the housing cover is open, the mini USB connection and the internal indicators are accessible.

!	*NOTICE*
	Electrostatic discharge Damage to electronic components in the aspirating smoke detector • When working on the open aspirating smoke detector, use anti-static floor mats and anti-static work surfaces. • Ground yourself immediately before opening the housing, e.g. by touching a ground point or wearing an anti-static belt.

!	*NOTICE*
	Accidental triggering of an alarm Triggering a false alarm • When the housing cover is opened, the buzzer sounds. The relay outputs remain active and the 4…20 mA analog output has been switched to fault (0.5 mA). • If the  button is pressed, the buzzer switches off and the relay outputs are deactivated. The 4…20 mA analog output remains on fault. • Closing the housing cover automatically reactivates the relay outputs and the 4…20 mA analog output switches to normal operation.



Opening the housing cover

Opening the housing cover

▷ The housing is free from dust.

1. Remove the two screws on the top of the aspirating smoke detector using a size 2 Phillips screwdriver (step 1).
2. Slide the housing cover in the direction of the arrow until it snaps into place (step 2).
   - ⇨ The housing cover is open.
   - ⇨ Opening of the housing is logged in the modification memory.
   - ⇨ The ○ fault indicator flashes and the buzzer is switched on.
   - ⇨ The relay outputs remain active and the 4…20 mA analog output has been switched to fault (0.5 mA).
3. Press the button to switch off the buzzer.
   - ⇨ The relay outputs are deactivated.
   - ⇨ The 4…20 mA analog output remains on fault.

⇨ The housing cover is open.

Closing the housing cover

▷ The size 2 Phillips screwdriver and the two screws are available.

1. Slide the housing cover in the opposite direction to the arrow (step 2) until it reaches the end position at the bottom.
2. **NOTICE! Connection cable clamped between the back box and the housing cover. Damage to the cable! Be aware of the connection cable when closing the housing cover.**
   - ⇨ Closing the housing cover automatically reactivates the relay outputs and the 4…20 mA analog output switches to normal operation.
   - ⇨ Closing of the housing is logged in the modification memory.
   - ⇨ The fault indicator ○ goes out and the audio warning is switched off.
3. Screw the housing cover to the housing base with the two screws. Tighten the screws by hand (step 1).

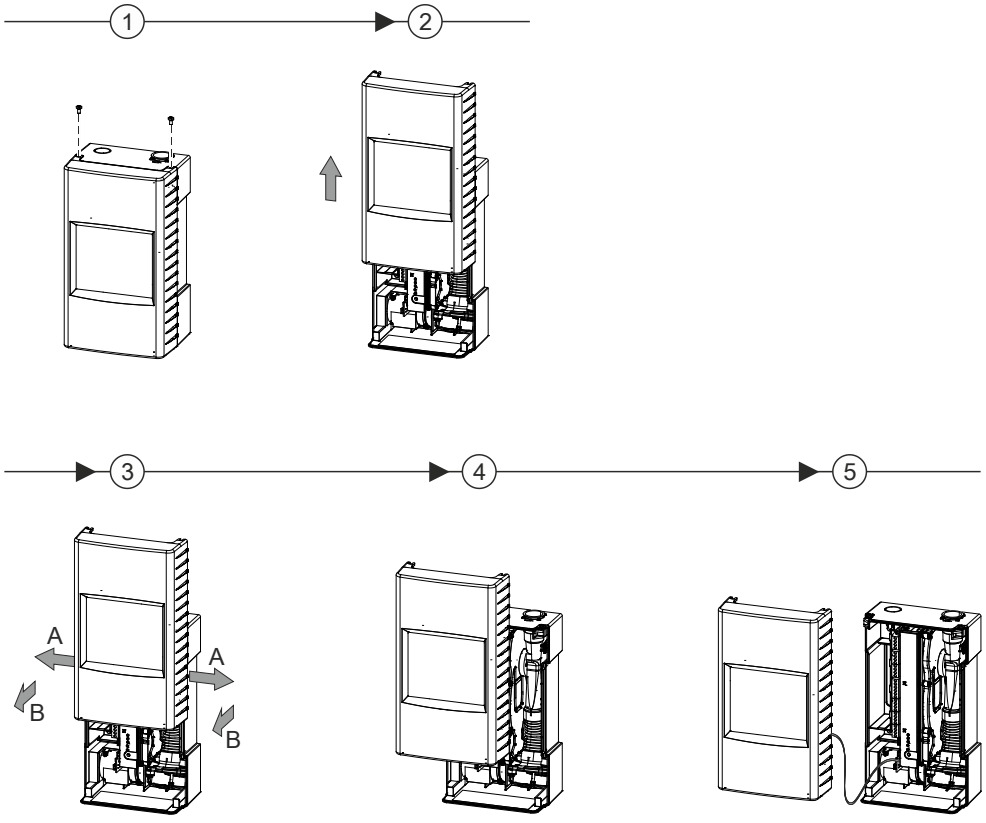
⇨ The housing cover is closed.

5.1.3 Removing and installing the housing cover when the power supply is switched off

!	*NOTICE*
	Electrostatic discharge Damage to electronic components in the aspirating smoke detector • When working on the open aspirating smoke detector, use anti-static floor mats and anti-static work surfaces. • Ground yourself immediately before opening the housing, e.g. by touching a ground point or wearing an anti-static belt.

When the housing cover is removed, you have access to:

- The fixing screws
- The cable entry
- All the mechanical components
- The electrical connections
- The rear of the front indicator



Removing the housing cover

Removing the housing cover

▷ The housing is free from dust.

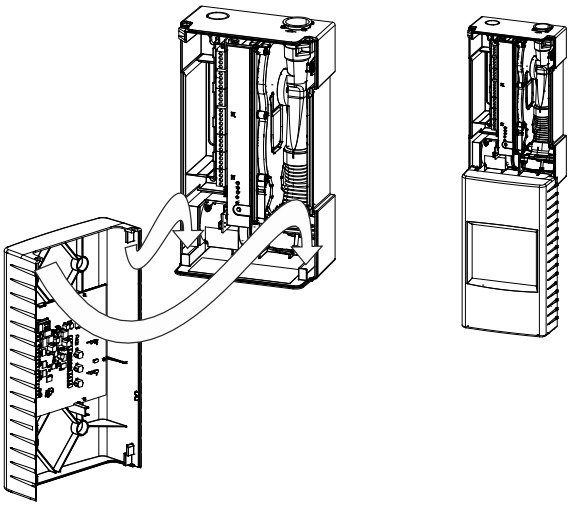
▷ Do not disconnect the connection cable running between the housing cover and the back box.

1. Remove the two screws on the top of the aspirating smoke detector using a size 2 Phillips screwdriver (step 1).
2. Slide the housing cover in the direction of the arrow until it snaps into place (step 2).

   ⇨ The housing cover is open.
3. Take hold of the housing cover on the left and right (A) and pull the side walls apart (step 3).
4. Lift the housing cover off the back box (B). When doing this, be aware of the connection cable (step 3).

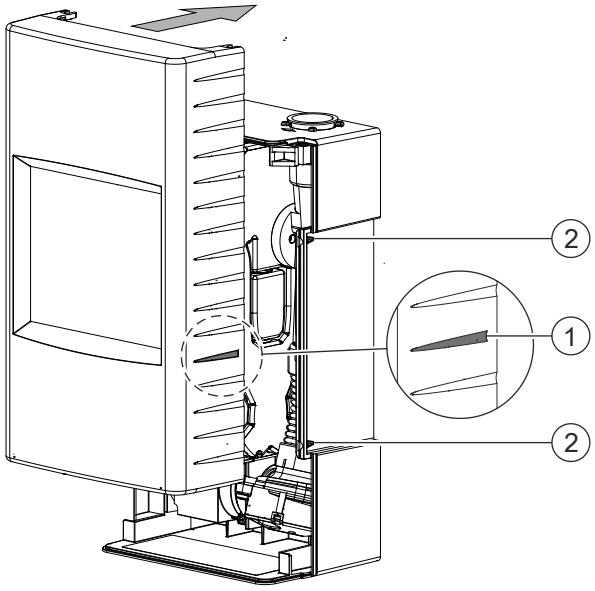
⇨ The housing cover is removed.

The removed housing cover can be hung on the back box.



Hanging the removed housing cover on the back box

Installing the housing cover



Markings on the housing cover and back box

▷ The size 2 Phillips screwdriver and the two screws are available.

1. Connect the connection cable plug to the interface card!
2. Place the housing cover on the back box so that marking (1) is located between both of the (2) markings.
3. Push the housing cover onto the back box in the direction of the arrow until the housing cover snaps into place.
4. **NOTICE! Connection cable clamped between the back box and the housing cover. Damage to the cable! Be aware of the connection cable when closing the housing cover.**
5. Slide the housing cover in the opposite direction to the arrow (step 2) until it reaches the end position at the bottom.
6. Screw the housing cover to the housing base with the two screws. Tighten the screws by hand.

⇨ The aspirating smoke detector's housing cover is installed.

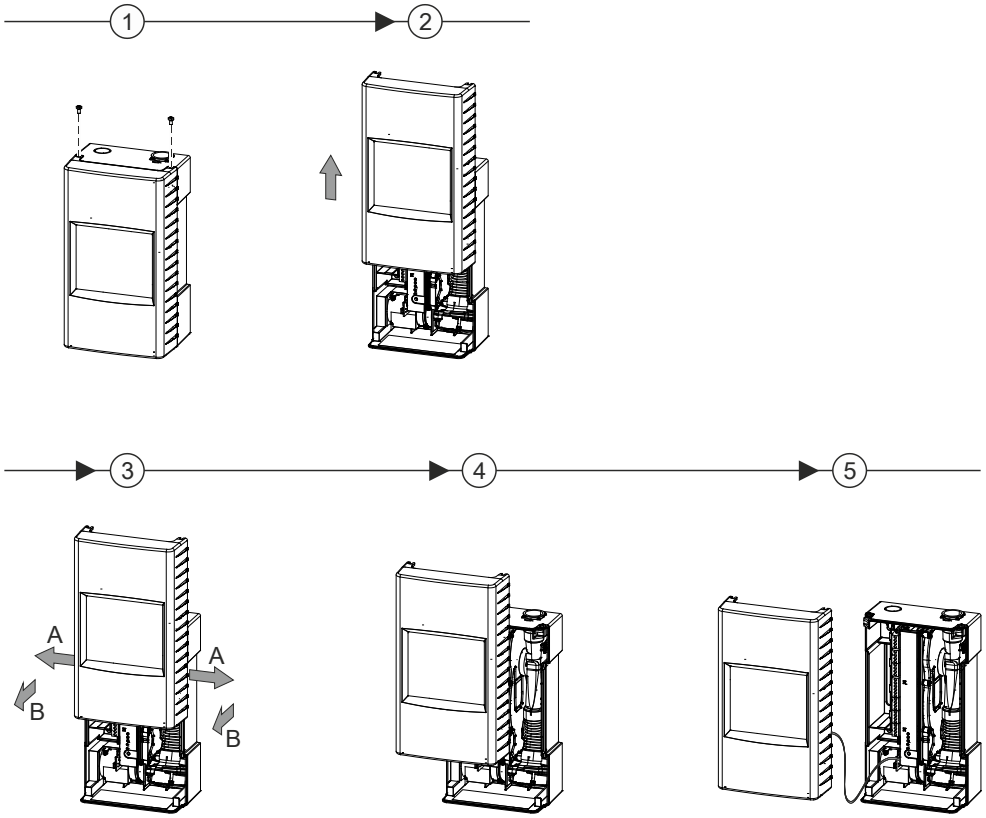
5.1.4 Removing and installing the housing cover when the power supply is switched on

!	*NOTICE*
	Electrostatic discharge Damage to electronic components in the aspirating smoke detector • When working on the open aspirating smoke detector, use anti-static floor mats and anti-static work surfaces. • Ground yourself immediately before opening the housing, e.g. by touching a ground point or wearing an anti-static belt.

!	*NOTICE*
	Accidental triggering of an alarm Triggering a false alarm • When the housing cover is opened, the buzzer sounds. The relay outputs remain active and the 4…20 mA analog output has been switched to fault (0.5 mA). • If the button is pressed, the buzzer switches off and the relay outputs are deactivated. The 4…20 mA analog output remains on fault. • Closing the housing cover automatically reactivates the relay outputs and the 4…20 mA analog output switches to normal operation.

When the housing cover is removed, you have access to:

- The fixing screws
- The cable entry
- All the mechanical components
- The electrical connections
- The rear of the front indicator



Removing the housing cover

Removing the housing cover

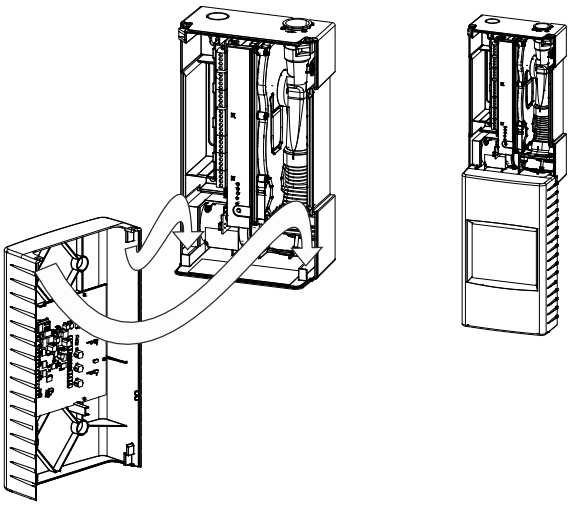
▷ The housing is free from dust.

▷ Do not disconnect the connection cable running between the housing cover and the back box.

1. Remove the two screws on the top of the aspirating smoke detector using a size 2 Phillips screwdriver (step 1).
2. Slide the housing cover in the direction of the arrow until it snaps into place (step 2).
   - ⇨ The housing cover is open.
   - ⇨ Opening of the housing is logged in the modification memory.
   - ⇨ The ○ fault indicator flashes and the buzzer is switched on.
   - ⇨ The relay outputs remain active and the 4…20 mA analog output has been switched to fault (0.5 mA).
3. Press the button to switch off the buzzer.
   - ⇨ The relay outputs are deactivated.
   - ⇨ The 4…20 mA analog output remains on fault.
4. Take hold of the housing cover on the left and right (A) and pull the side walls apart (step 3).
5. Lift the housing cover off the back box (B). When doing this, be aware of the connection cable (step 3).

⇨ The housing cover is removed.

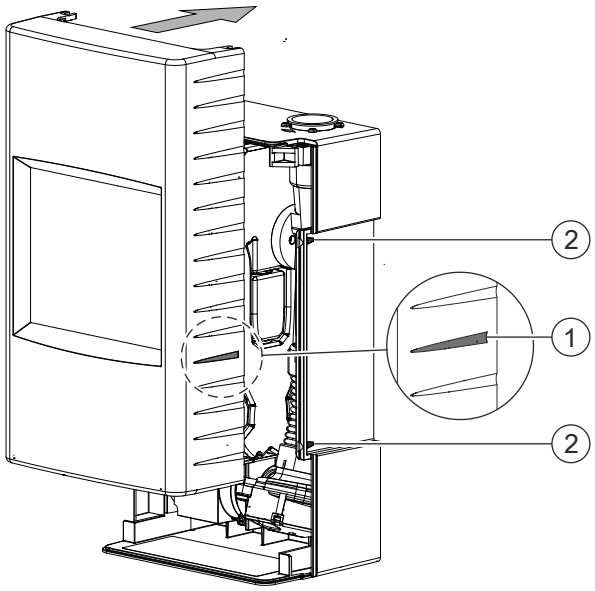
The removed housing cover can be hung on the back box.



Hanging the removed housing cover on the back box

If the connection cable does need to be disconnected, you must switch off the power supply before removing the cable from the interface card.

Installing the housing cover



Markings on the housing cover and back box

▷ The size 2 Phillips screwdriver and the two screws are available.

1. Connect the connection cable plug to the interface card!
2. Place the housing cover on the back box so that marking (1) is located between both of the (2) markings.
3. Push the housing cover onto the back box in the direction of the arrow until the housing cover snaps into place.
4. **NOTICE! Connection cable clamped between the back box and the housing cover. Damage to the cable! Be aware of the connection cable when closing the housing cover.**
5. Slide the housing cover in the opposite direction to the arrow (step 2) until it reaches the end position at the bottom.

   ⇨ The fault indicator ○ goes out.
   ⇨ The relay outputs are automatically reactivated.
   ⇨ The 4…20 mA analog output switches to normal operation.
6. Screw the housing cover to the housing base with the two screws. Tighten the screws by hand.

⇨ The aspirating smoke detector's housing cover is installed.

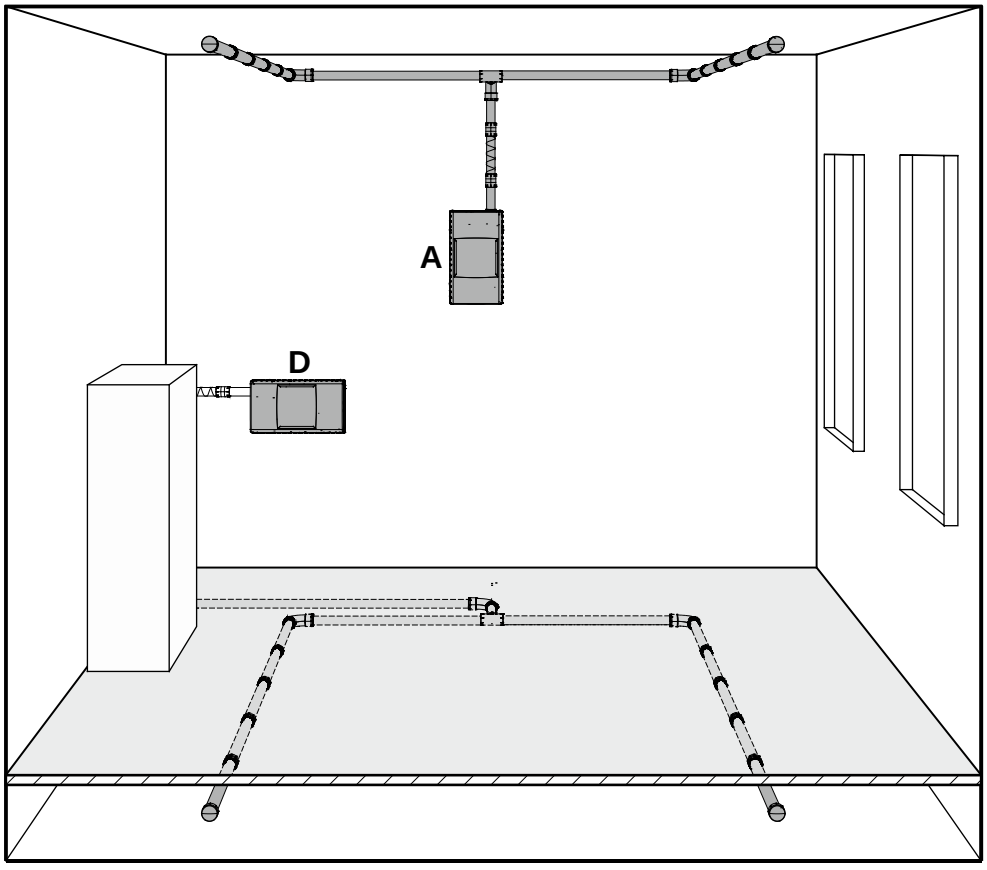
5.1.5 Installation position and space requirements

Installation site requirements

- Only to be installed within a building where the ambient conditions are permissible
- No direct sunlight
- Take into account the additional space required by and the need to access the following:
  - External power unit and batteries
  - Blowing-out unit (optional)
  - Water trap (optional)
- The aspirating smoke detector can be installed either horizontally or vertically on a level surface.
- The dust load should be low at the installation site, because the aspirating smoke detector housing is opened for maintenance purposes.
- Ensure that there is at least 150 mm of free space on each side of the installed aspirating smoke detector to ensure the pipe system and electrical connections can be installed with ease.

Connecting to the pipe system

The aspirating smoke detector can be installed in different installation locations. The installation location to be used depends on the pipe system's connection to the aspirating smoke detector.

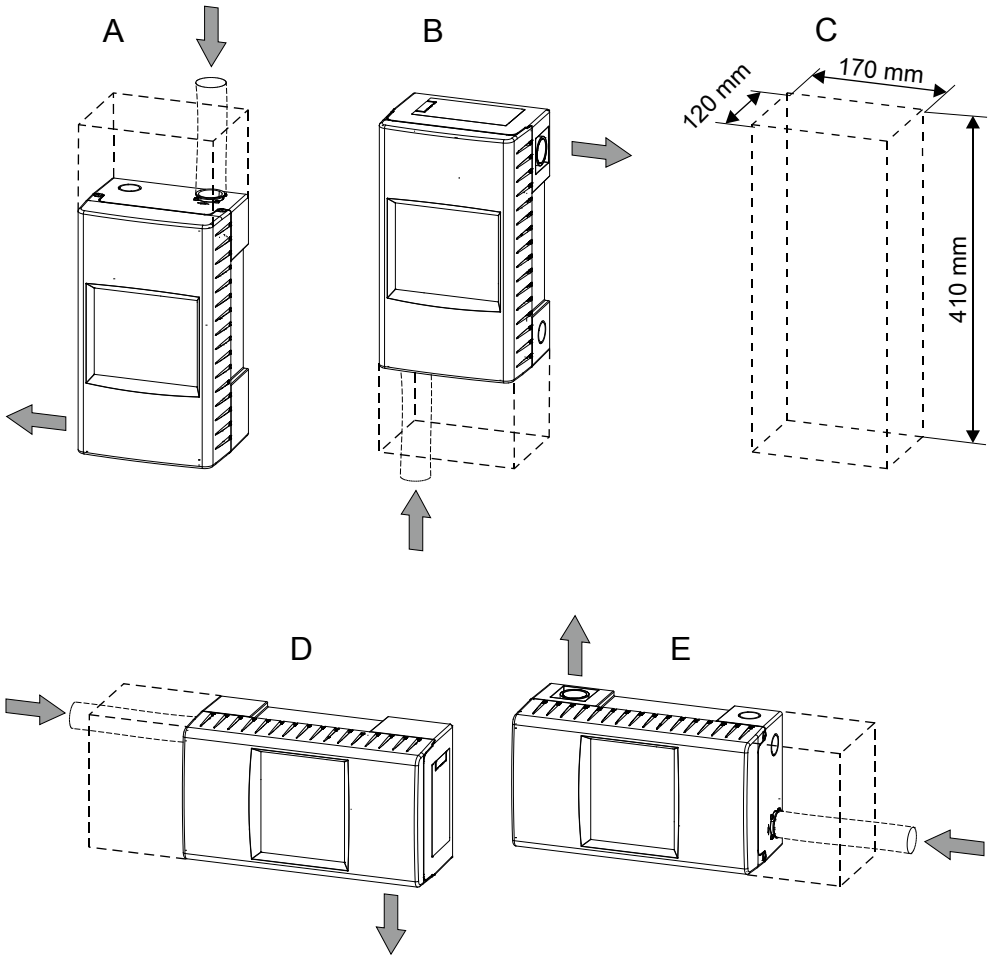


Aspirating smoke detectors with different installation locations

Four connection types are possible:

- Standard: From above (A)
- From below (B) when the aspirating smoke detector is installed rotated by 180°
- From left (D) or right (E) when the aspirating smoke detector is installed horizontally

When the aspirating smoke detector is installed horizontally, no adapted alignment of the front panel is possible. See 'Adapting the front indicator to the installation position [→ 58]'.



Installation position

A Aspiration from above

B Aspiration from below

C Space required by the aspirating smoke detector when the housing cover is open

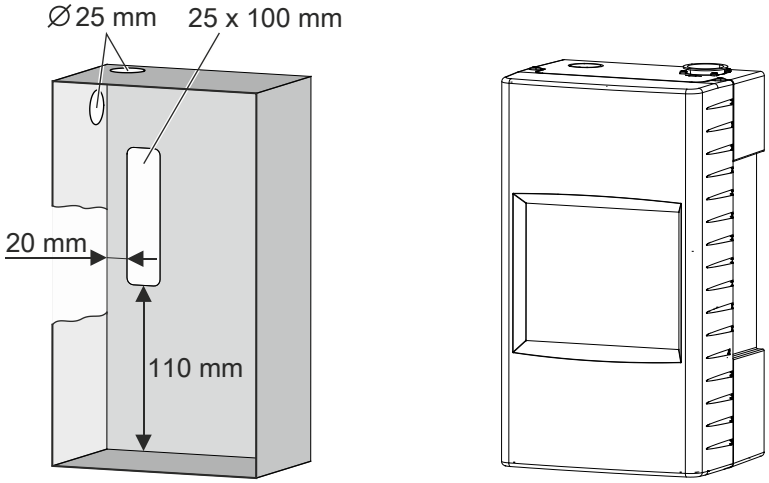
D Aspiration from left

E Aspiration from right

Cable entry

Position of hole	Size of hole
Breakthrough on rear	25 x 100 mm
Breakthrough on left side of housing	Diameter 25 mm
Breakthrough on top of housing	Diameter 25 mm

If the aspirating smoke detector is installed rotated by 180°, the circular breakthroughs are found on the bottom at the right-hand side.



Cable entry with standard installation position

To prepare the electrical connections, perform the following steps:

1. Break through the necessary cable entries (e.g., using a screwdriver).
2. Attach the plastic cable entries (usual size M20) to the housing.
3. Insert the cables through the relevant cable entries.

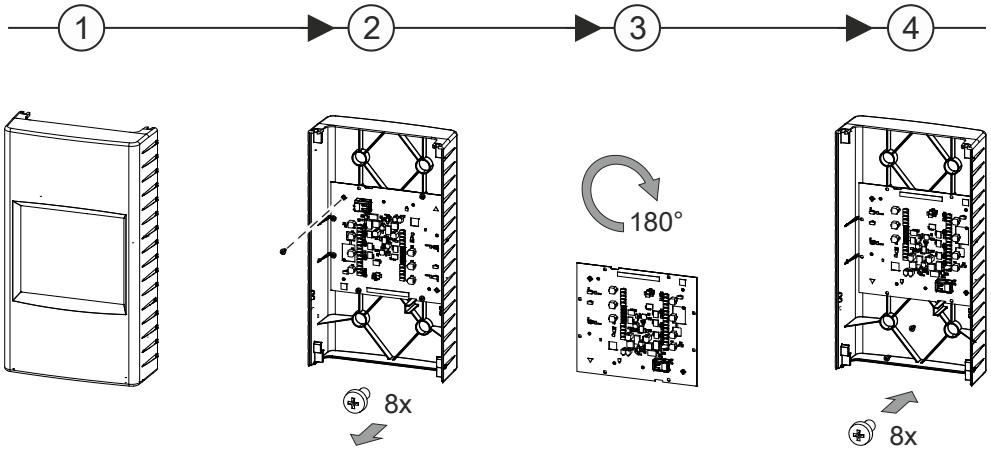
See also

Adapting the front indicator to the installation position [→ 58]
Technical data for FDA241, FDA221 [→ 105]

5.2 Mounting

5.2.1 Adapting the front indicator to the installation position

The aspirating smoke detector can be installed rotated by 180° if required. The front indicator must then also be installed rotated by 180°.



Adapting the front indicator to the installation position

▷ The housing cover has been removed (step 1).

1. Loosen the 8 screws on the inside of the housing cover (step 2).
2. Rotate the front indicator by 180° (step 3).
3. Fasten the front indicator to the housing cover using the 8 screws (step 4).

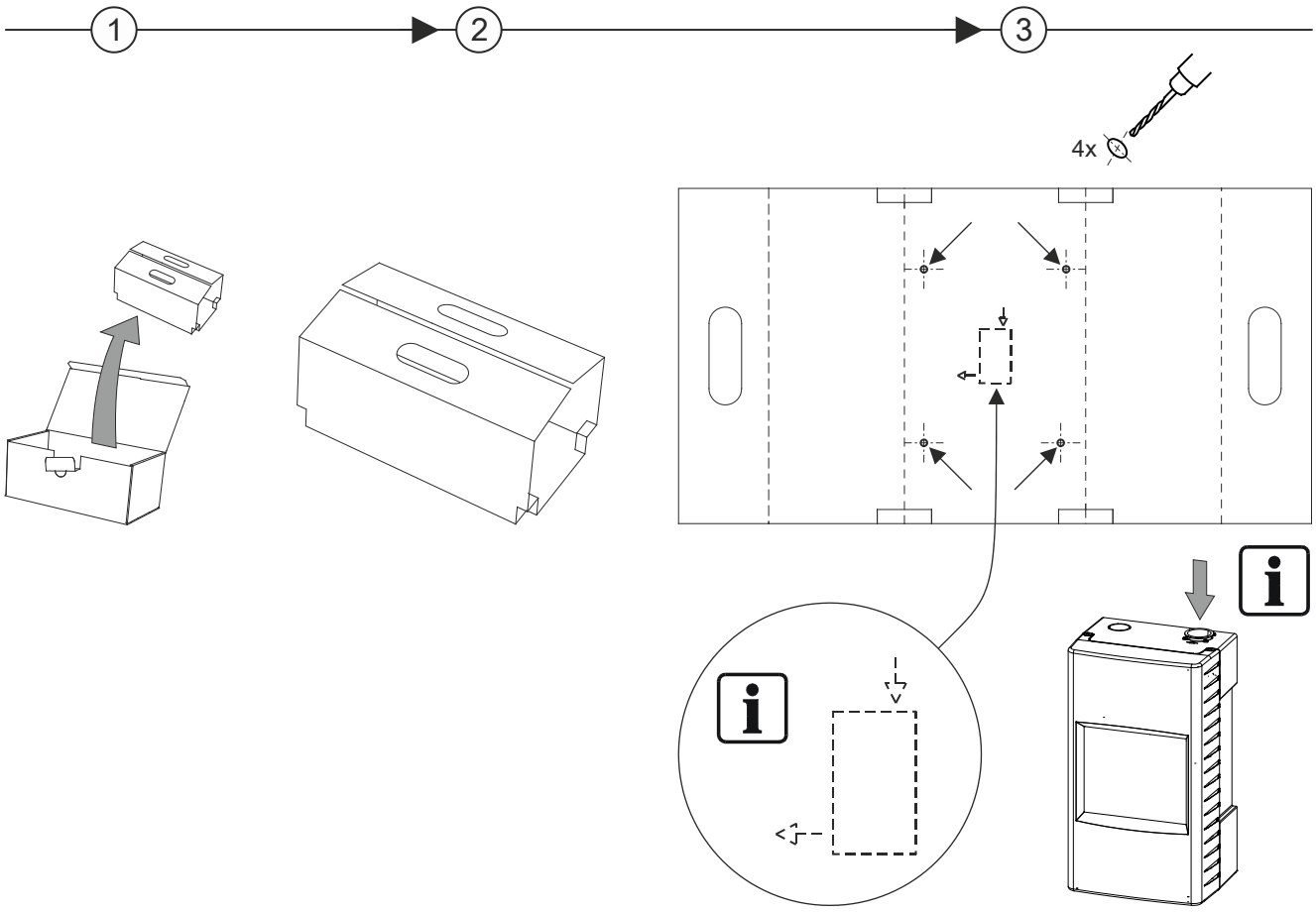
⇨ The front indicator is adapted to the installation position.

5.2.2 Fastening on a level substructure

A drilling template is punched in the inner packaging of the aspirating smoke detector packaging.

The punched symbol in the center of the packaging indicates the airflow direction (air inlet and air outlet).

The mounting holes in the back box are not symmetrical, so use the drilling template.



Using the drilling template

- ▷ 4 screws with a shaft diameter of 5…6 mm and a head diameter of 8…10 mm are available.
- ▷ A suitable tool for drilling and screwing is available.
- ▷ The housing cover is removed and the cable loosened.
- ▷ The product must be installed on a level, non-combustible base.

1. Use the unfolded packaging as the drilling template.
   – Note the arrow symbol for the direction of the pipe connections (step 3).
2. Drill the mounting holes.
3. If necessary: Use suitable dowels.

4. Screw the four screws into the mounting holes.
   – Do not screw in the screws as far as the stop. A gap of approx. 10 mm must remain between the screw head and the wall.
5. Hang the back box on the screws.
6. Carefully tighten the four screws.
   ⇨ The back box is fastened.
7. Reconnect the cable and close the housing cover.

⇨ The aspirating smoke detector is installed.

5.2.3 Connecting the pipe system to the aspirating smoke detector

!	*NOTICE*
	Connection between pipe system and aspirating smoke detector Damage to the pipe system and/or the aspirating smoke detector • Do not glue the pipe system to the aspirating smoke detector! If the pipe system has to be separated from the aspirating smoke detector for maintenance work or repairs, components may be damaged.

▷ The pipe system is installed.

▷ The last 500 mm of the pipe system on the aspirating smoke detector must be straight, such that flow turbulences can be eliminated before entering the aspirating smoke detector.

1. Press a short pipe securely into the air inlet on the aspirating smoke detector.
2. Connect the pipe system and the pressed-in pipe piece to the aspirating smoke detector.

⇨ The pipe system is connected to the aspirating smoke detector.

You will find more information in document A6V10334435.

See also

Applicable documents [→ 9]

5.2.3.1 Return line

If there is an air pressure difference of >45 Pa between the monitored area and the aspirating fire detector, a return line is required.

!	*NOTICE*
	Connection between aspirating smoke detector and return line Damage to the return line and/or the aspirating smoke detector • Do not glue the return line to the aspirating smoke detector! If the return line has to be separated from the aspirating smoke detector for maintenance work or repairs, the return line or the aspirating smoke detector may be damaged. Press the return line securely into the air outlet on the aspirating smoke detector.

You will find more information in document A6V10334435.

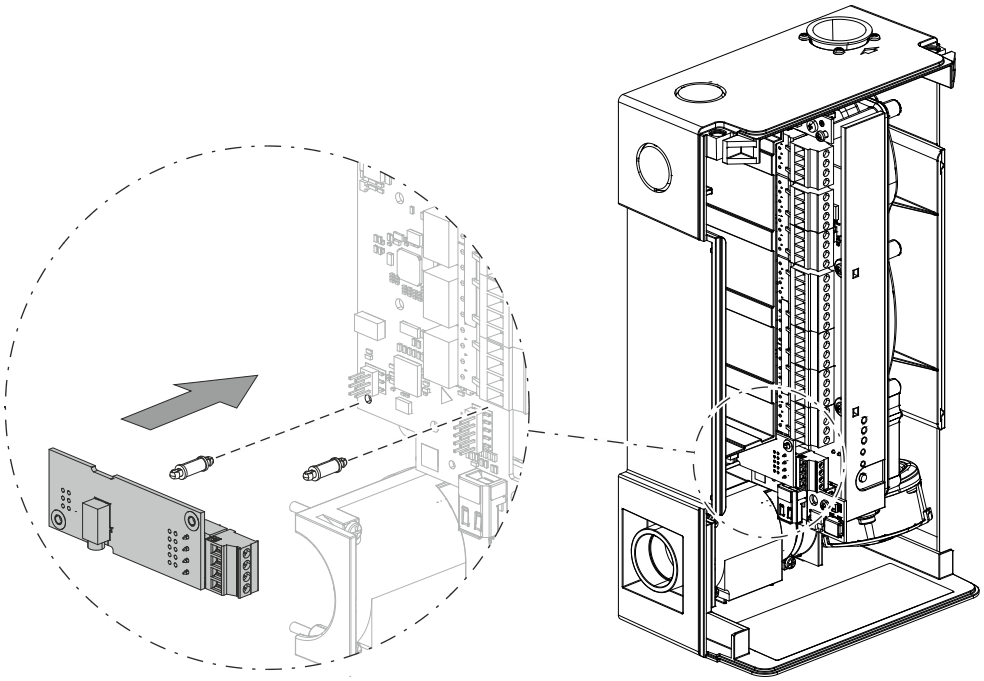
See also

Applicable documents [→ 9]

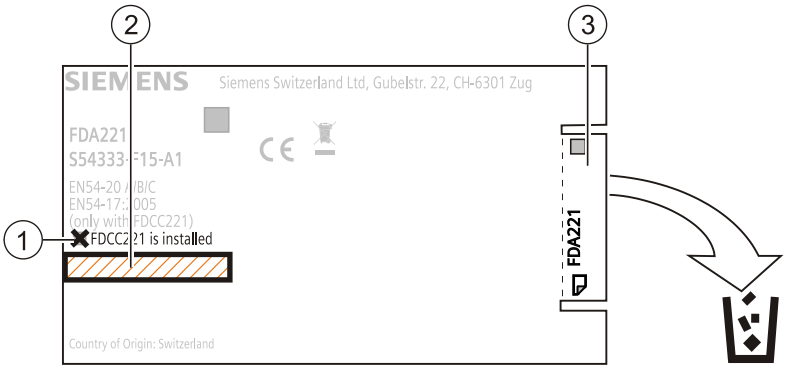
5.2.4 Installing communication transponder FDCC221S

Communication transponder FDCC221S may only be installed if the aspirating smoke detector is connected to FDnet/C-NET. Installation is not permitted in the case of standalone operation.

Communication transponder FDCC221S has its own ID. The ID of communication transponder FDCC221S is made visible to the detector line and it replaces the ID of the aspirating smoke detector.



Installing communication transponder FDCC221S in an aspirating smoke detector



Changes on the type plate when the FDCC221S is installed

1 Mark indicating that the FDCC221S is installed
2 ID adhesive label from FDCC221S for aspirating smoke detector
3 Tear-off adhesive label for installation plan

Mounting

▷ The housing cover is open.

▷ The aspirating smoke detector's external power supply is switched off and disconnected from the aspirating smoke detector.

▷ A communication transponder FDCC221S (accessory) is available.

1. Insert communication transponder FDCC221S into the aspirating smoke detector's interface card with the two spacer bolts as shown in the diagram.
2. On the type plate of the aspirating smoke detector, place a mark in the 'FDCC221S is installed' field (1).
3. Use the two ID adhesive labels from the FDCC221S as described below:
   - Take the first ID adhesive label and stick it over the type plate of the aspirating smoke detector (2).
   - Use the second ID adhesive label for the installation plan.
   - Remove the tear-off adhesive label from the aspirating smoke detector and dispose of it (3).
4. After switching off the detector line, connect it to communication transponder FDCC221S. You will find the terminal assignment in the 'Connecting to the detector line with the FDCC221S [→ 71]' chapter.
5. Re-connect the switched off external power supply for the aspirating smoke detector.
6. Close the housing cover.

⇨ Communication transponder FDCC221S is installed and connected to the detector line.

Only start the detector line when the external power supply for the aspirating smoke detector has been established.

See also

Communication transponder FDCC221S [→ 37]

5.3 Installation

	⚠ CAUTION
	Electrical voltage on lines Risk of injury due to electric shock • During mounting and installation work, electrical voltage must not be applied to the lines.

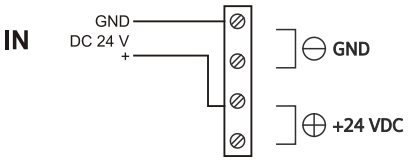
Note the positive and negative poles.
Only connect one wire per terminal. This is the only way to ensure the connection is failure-free for the entire service life of the device.

5.3.1 Connecting the external power unit

Two connection terminals are available for the aspirating smoke detector's power supply. This allows more aspirating smoke detectors to be connected to a power unit.

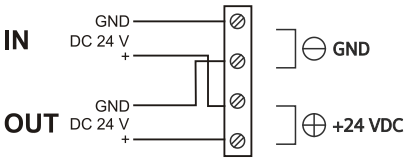
Prerequisite: The power unit used satisfies the requirements according to the 'External power unit and batteries' chapter.

Connection diagram for 'one aspirating smoke detector on one power unit'



Connection without forwarding to other aspirating smoke detectors

Connection diagram for 'multiple aspirating smoke detectors on one power unit'



Connection with forwarding to other aspirating smoke detectors

IN Connection of external power unit

OUT Connection for the power supply of other aspirating smoke detectors

Properties

- Protected against polarity reversal
- Connection of more aspirating smoke detectors

Procedure

▷ A suitable external power unit is available.

▷ The aspirating smoke detector's housing cover is removed.

1. Before connecting the external power unit to the terminal block, check the voltage provided by the power unit. Permissible value: DC 24 V ±4 V
2. Connect the power unit to the aspirating smoke detector(s) according to the connection diagram shown.

⇨ The external power unit is connected to the aspirating smoke detector(s).

See also

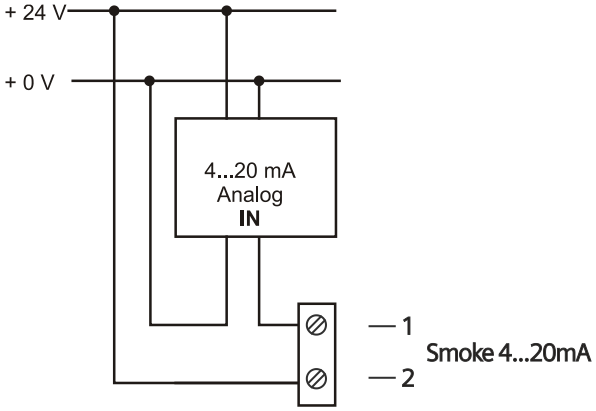
External power unit and batteries [→ 31]
Power supply kit A (70 W) FP120-Z1 [→ 37]

5.3.2 'Smoke 4…20 mA' analog output

Configurable 4…20 mA analog output.

The setting is made in the 'Current loop' menu with the 'FXS2051 ASD Configuration Tool' software for one of the following values:

- Smoke value (device default)
- Dust value (FDA241 only)
- Airflow (FDA241 only)
- Fine dust value (FDA241 only)



Example illustrating analog input (IN)

Connection for DC 9…25 V power supply

Smoke value (device default)	4…20 mA analog output
No smoke	4 mA
Inspect	8 mA
Prealarm	12 mA
Fire 1	16 mA
Fire 2	20 mA

Airflow	4…20 mA analog output
0 l/min	4 mA
20 l/min	8 mA
40 l/min	12 mA
60 l/min	16 mA
80 l/min	20 mA

Dust value	4…20 mA analog output
No dust	4 mA
Low dust value	8 mA
Medium dust value	12 mA
High dust value	16 mA
Very high dust value	20 mA

Fine dust value	4…20 mA analog output
0 µg/m³	4 mA
30 µg/m³	8 mA
60 µg/m³	12 mA
90 µg/m³	16 mA
150 µg/m³	20 mA

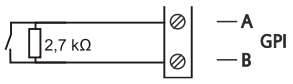
Properties

- With electrically isolated, passive two-wire 4…20 mA analog output.
- The connection is independent of polarity.
- The increment corresponds to the increment of the smoke indicator (bar graph indicator). [➙ 24]
- The error indicator can be suppressed with the 'FXS2051 ASD Configuration Tool' software.
- 'Current loop' output.

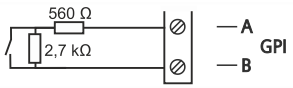
5.3.3 Configurable 'GPI' input

Configurable input for an external switch. The setting is made in the 'Relay and GPI' menu with the 'FXS2051 ASD Configuration Tool' software.

Monitoring for open line



Monitoring for short circuit and open line

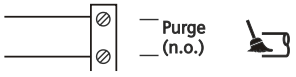


Properties

- Can be configured to trigger the following actions:
  - Switching to Manned/Unmanned (not possible when fire control panel FC20xx/FC72x is connected)
  - Resetting
  - Activating blowing-out unit
  - Deactivates all relays and alarm outputs
- Monitoring for open line (1 resistor)
- Monitoring for short circuit and open line (2 resistors)
- Input for error monitoring on the external power unit

5.3.4 'Purge' relay output for blowing out (with FDA241 only)

Relay output for controlling an external blowing-out unit.



Connection: n.o.

Properties

- Suitable for controlling an external blowing-out unit.
- Configuration of:
  - Purge interval
  - Purge duration

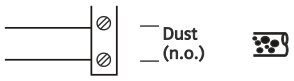
When the aspirating smoke detector is in operation, the setting is made on the FDnet/C-NET using the fire control panel configuration software.

- For fire control panels FC20xx: 'SintesoWorks'
- For fire control panels FC72x: 'Cerberus-Engineering-Tool'

When the aspirating smoke detector is in standalone operation, the setting is made in the 'Purge' menu with the 'FXS2051 ASD Configuration Tool' software.

5.3.5 'Dust' relay output for dust value (with FDA241 only)

Relay output for external monitoring of the dust value.



Connection: n.o.

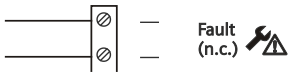
Properties

- Suitable for external monitoring of the dust value.
- Is activated with increased dust concentration.

5.3.6 'Fault' relay output for error messages

Relay output for error messages.

State	Relay
Normal (no error)	Closed
Error or disconnected from the power supply	Open



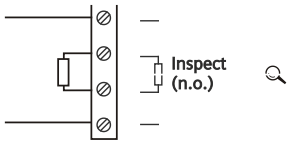
Connection: n.c. (default setting)

Properties

- The relay deactivates if an error occurs.

5.3.7 'Inspect' relay output for early warning (with FDA241 only)

Relay output for early warning.



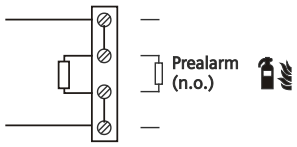
Connection: n.o. (default setting) and resistance according to specification of the connected device.

Properties

- Activation occurs according to the chosen setting.
- The connection can be changed to 'n.c.' with the 'FXS2051 ASD Configuration Tool' software. The chosen setting applies automatically to 'Inspect', 'Prealarm', 'Fire 1', 'Fire 2'.

5.3.8 'PreAlarm' relay output for pre-alarm

Relay output for 'pre-alarm' alarm level.



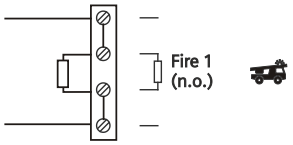
Connection: n.o. (default setting)

Properties

- Activation occurs according to the chosen setting.
- The connection can be changed to 'n.c.' with the 'FXS2051 ASD Configuration Tool' software. The chosen setting applies automatically to 'Inspect', 'Prealarm', 'Fire 1', 'Fire 2'.

5.3.9 'Fire 1' relay output for fire alarm 1

Relay output for alerting the fire brigade.



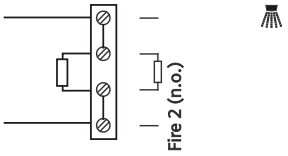
Connection: n.o. (default setting)

Properties

- Activation occurs according to the chosen setting.
- The connection can be changed to 'n.c.' with the 'FXS2051 ASD Configuration Tool' software. The chosen setting applies automatically to 'Inspect', 'Prealarm', 'Fire 1', 'Fire 2'.

5.3.10 'Fire 2' relay output for fire alarm 2

Relay output for alarm level 2 to activate external extinguishing equipment.



Connection: n.o.

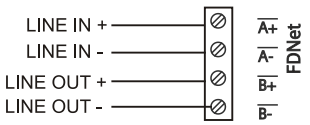
Properties

- Activation occurs according to the chosen setting.
- The connection can be changed to 'n.c.' with the 'FXS2051 ASD Configuration Tool' software. The chosen setting applies automatically to 'Inspect', 'Prealarm', 'Fire 1', 'Fire 2'.

5.3.11 Connecting to the detector line with the FDCC221S

The aspirating smoke detector is directly connected to the FDnet/C-NET detector line using communication transponder FDCC221S (accessory).

Terminal assignment

View in the aspirating smoke detector	Terminal name	Assignment
	A+	LINE IN +
	A-	LINE IN -
	B+	LINE OUT +
	B-	LINE OUT -

▷ The external power unit is connected to the aspirating smoke detector.

1. Switch the power supply on.
2. Check whether the aspirating smoke detector is being supplied with power. The
   ● ⏻ LED lights up.
3. Start the detector line.

⇨ The aspirating smoke detector is not detected as FDA241 or FDA221 by the fire control panel.

If the aspirating smoke detector has not been detected correctly, refer to the fire control panel documentation for the remainder of the process.

The following document applies to fire control panels **FC20xx**: 009052, chapter 'Modifying and extending the detector line'.

The following document applies to fire control panels **FC72x**: A6V10210416, chapter 'Modifying and extending the detector line'.

1. After completing step 1 as described in the document, switch off the power supply for the aspirating smoke detector.

2. Wait one minute; then switch the aspirating smoke detector power supply back on.

⇨ The aspiration unit starts up.

3. Now proceed as described in the documentation for the fire control panel.

If the aspirating smoke detector has already been registered on the detector line, refer to the fire control panel documentation for the remainder of the process.

The following document applies to fire control panels **FC20xx**: 009052, chapter 'Removing or replacing non-stationary FDnet devices'.

The following document applies to fire control panels **FC72x**: A6V10210416, chapter 'Removing or replacing non-stationary C-NET devices'.

See also

Applicable documents [→ 9]

5.3.12 Connection to input/output module

Aspirating smoke detectors FDA241 and FDA221 can be connected to a fire control panel via an input/output module.

For fire control panels FC20xx and FC72x, the aspirating smoke detector should be connected via the communication transponder FDCC221S, see chapter 'Connecting to the detector line with the FDCC221S [→ 71]'.

!	*NOTICE*
	Incorrect configuration of the fire control panel Signals from the input/output module are not evaluated correctly • After connecting the input/output module, check the configuration of your fire control panel. • Adapt the configuration if necessary.

Only use potential-free contacts to connect the input/output module to the interface card [→ 29] of the aspirating smoke detector.

The 'Smoke 4…20 mA' analog output must not be used to connect the input/output module.

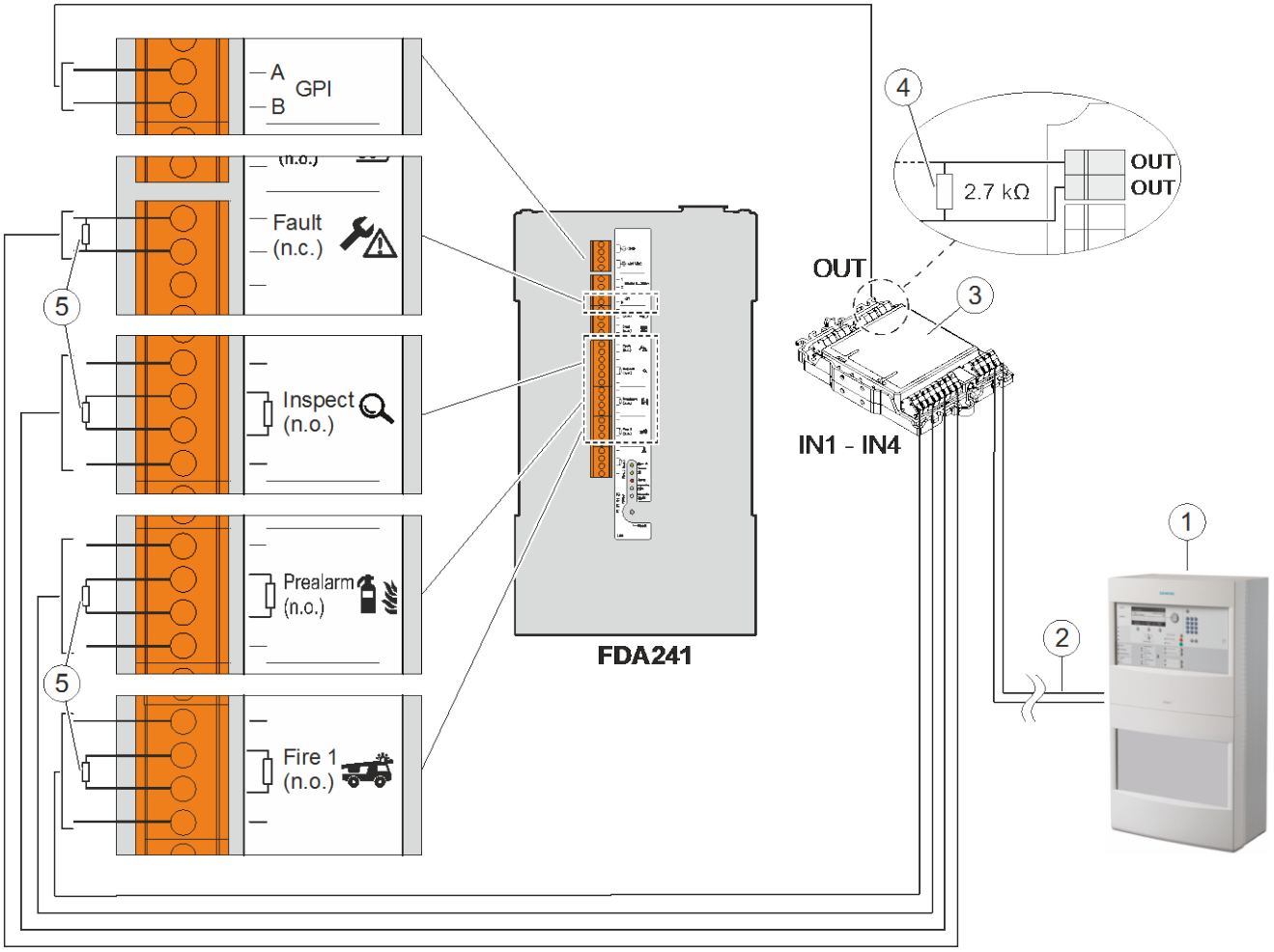
An output on the input/output module must be connected to the configurable 'GPI' input of the aspirating smoke detector so that it is possible to reset an alarm or the status of the aspirating smoke detector from the fire control panel.
Please be aware that the configuration of the aspirating smoke detector must be adapted using the 'FXS2051 ASD Configuration Tool' software in this case. See also document A6V10332759, chapter "Other settings' menu', section 'Reset input configuration options'.

Different connection variants are possible. Two variants are shown as examples below.

The selection of a suitable input/output module is dependent on the number of inputs and outputs required.

Variant 1 (for aspirating smoke detector FDA241 only)

Input/output module used:	FDCIO222
Monitoring:	For open line



Example representation of monitoring for open line when using an input/output module FDCIO222

1	Fire control panel	4	Monitoring resistor for GPI input (see chapter 'Configurable 'GPI' input [→ 68]')
2	Detector line	5	Monitoring resistors
3	Input/output module FDCIO222		

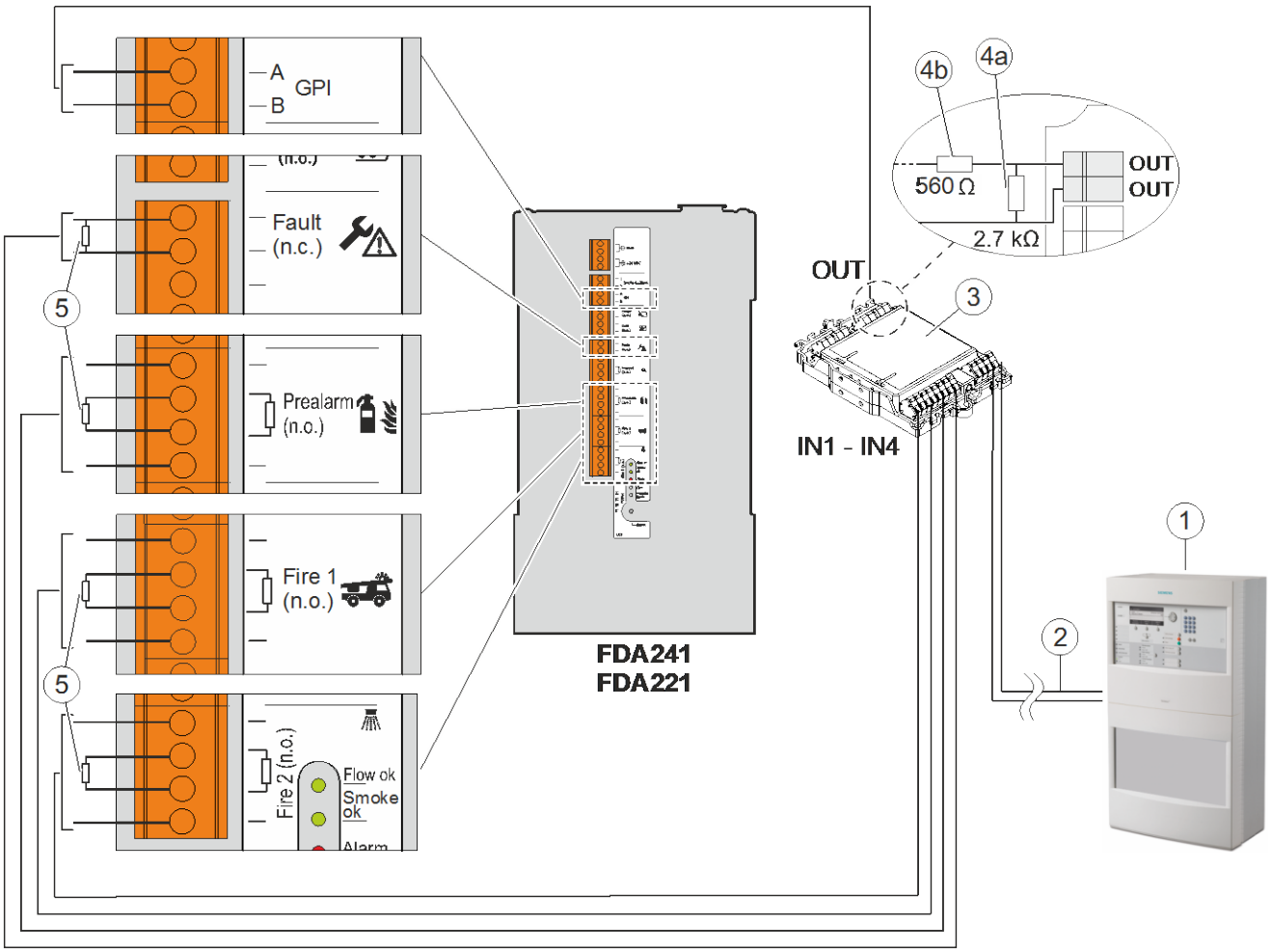
For the monitoring resistors (5), observe the device-specific specifications for the input/output module used. You will find this information in the example shown with the input/output module FDCIO222 in document 007023.

Interface	Function
'GPI'	Possible to reset an alarm or the status of the aspirating smoke detector using the fire control panel
'Fault'	A general fault is indicated on the fire control panel
'Inspect 1'	An early warning is indicated on the fire control panel
'Prealarm'	A pre-alarm is indicated on the fire control panel
'Fire 1'	An alarm is indicated on the fire control panel

No external extinguishing equipment can be controlled with this connection variant.

Variant 2 (for aspirating smoke detectors FDA241 or FDA221)

Input/output module used:	FDCIO222
Monitoring:	For open line and short-circuit



Example representation of monitoring for open line and short-circuit when using an input/output module FDCIO222

1	Fire control panel	4a, 4b	Monitoring resistors for GPI input (see chapter 'Configurable 'GPI' input [→ 68]')
2	Detector line	5	Monitoring resistors
3	Input/output module FDCIO222		

For the monitoring resistors (5), observe the device-specific specifications for the input/output module used. You will find this information in the example shown with the input/output module FDCIO222 in document 007023.

Interface	Function
'GPI'	Possible to reset an alarm or the status of the aspirating smoke detector using the fire control panel
'Fault'	A general fault is indicated on the fire control panel
'Prealarm'	A pre-alarm is indicated on the fire control panel
'Fire 1'	An alarm is indicated on the fire control panel
'Fire 2'	Controls external extinguishing equipment

See also

Applicable documents [→ 9]

6 Configuration

The aspirating smoke detector can be configured in two ways:

- Via the fire control panel and using the configuration software for the FS20/FS720 (with limited configuration options)
- Using the 'FXS2051 ASD Configuration Tool' software

Values whose parameters were set from the fire control panel cannot be changed with the 'FXS2051 ASD Configuration Tool' software. They are only displayed in the 'FXS2051 ASD Configuration Tool' software.

A detector-dependent password must be entered locally on the aspirating smoke detector to obtain writing rights on the aspirating smoke detector with the 'FXS2051 ASD Configuration Tool' software. The initial password is 1234. This can be changed during installation. If you have lost the details of your password, please contact the Customer Support Center.

Option via fire control panel	Standalone option
All parameters can be read with the 'FXS2051 ASD Configuration Tool' software.	All parameters can be read with the 'FXS2051 ASD Configuration Tool' software.
Certain parameters can be read from the fire control panel.	
Certain parameters can be configured from the fire control panel.	All parameters can be configured with the 'FXS2051 ASD Configuration Tool' software.
Only those parameters that cannot be configured from the fire control panel can be configured with the 'FXS2051 ASD Configuration Tool' software.	

You will find more information on configuring the aspirating smoke detector with the 'FXS2051 ASD Configuration Tool' software in document A6V10332759. You will find instructions for installing the driver in document A6V10348930.

You will find information about configuring with the software for the fire detection system in document 009078 for fire control panels FC20xx and document A6V10210424 for fire control panels FC72x.

See the chapter 'Applicable documents [→ 9]'.

You will find information about the parameters in the chapter 'Operating modes [→ 39]'.

Updating the firmware

▷ The existing version of the firmware has been checked against the latest version and needs to be updated.

▷ The 'FXS2051 ASD Asyst Tool' software is running. The installed version can be displayed on the 'Help' main menu under the 'About' menu.

1. Use the initial password '1234' or enter your own password.
2. Go to the 'Update' main menu and select the 'Update firmware' submenu or use the keyboard shortcut <Ctrl> + <U> instead.
   ⇨ The firmware is updated.
   ⇨ The device time is reset automatically.
3. Update the device time.

⇨ The firmware update is complete.

Changing the configuration

▷ The 'FXS2051 ASD Configuration Tool' software is running.

▷ The first basic settings have been made on the 'FXS2051 ASD Configuration Tool'.

1. Select the 'Connect' command in the contact bar to establish contact.
2. Use the initial password '123456' or enter your own password.
3. To upload parameters, select the 'Transfer parameters to PC' command in the contact bar or use the keyboard shortcut <Ctrl> + <A> instead.
   ⇨ Data is uploaded from the aspirating smoke detector to the PC.
4. Change the settings to suit your requirements.
5. To download parameters, select the 'Transfer parameters to ASD' command in the contact bar or use the keyboard shortcut <Ctrl> + <Y> instead.
   ⇨ Data is downloaded from the PC to the aspirating smoke detector.

⇨ The configuration has been changed.

7 Commissioning

The aspirating smoke detector is supplied with factory settings and can be operated with these settings. If it is used on an addressed detector line, some basic settings (date, time, sensitivity, etc.) can be made from the control panel. However, to make all the settings you will need the 'FXS2051 ASD Configuration Tool' software.

7.1 Operation on addressed detector line (FDnet/C-NET)

Proceed as described in Standalone application [→ 82] and then start the detector line.

▷ The external power unit is connected to the aspirating smoke detector.

1. Switch the power supply on.
2. Check whether the aspirating smoke detector is being supplied with power. The
   - ⏻ LED lights up.
3. Start the detector line.

⇨ The aspirating smoke detector is not detected as FDA241 or FDA221 by the fire control panel.

If the aspirating smoke detector has not been detected correctly, refer to the fire control panel documentation for the remainder of the process.

The following document applies to fire control panels **FC20xx**: 009052, chapter 'Modifying and extending the detector line'.

The following document applies to fire control panels **FC72x**: A6V10210416, chapter 'Modifying and extending the detector line'.

1. After completing step 1 as described in the document, switch off the power supply for the aspirating smoke detector.
2. Wait one minute; then switch the aspirating smoke detector power supply back on.

⇨ The aspiration unit starts up.

3. Now proceed as described in the documentation for the fire control panel.

If the aspirating smoke detector has already been registered on the detector line, refer to the fire control panel documentation for the remainder of the process.

The following document applies to fire control panels **FC20xx**: 009052, chapter 'Removing or replacing non-stationary FDnet devices'.

The following document applies to fire control panels **FC72x**: A6V10210416, chapter 'Removing or replacing non-stationary C-NET devices'.

The following settings can be made directly from the control panel to change the basic settings:

- Setting the 'Manned' or 'Unmanned' parameter set
- Setting the 'Purge' activation mode
- Setting the 'Air'
- Setting the Detector mode
- Setting the Test mode

These settings cannot be changed with the 'FXS2051 ASD Configuration Tool' software, only read.

Selection of settings

Field	Action
Purge activation mode	Select the purge interval You can choose from the following: ● Off ● Auto max. 1x ● Auto max. 2x ● Auto max. 3x ● Interval 12 h ● Interval 1 week ● Inteval 1 month ● Interval 4 months
Purge cycle duration	Set purge duration You can choose from the following: ● 20 s (default) ● 5 s ● 10 s ● 15 s ● 30 s ● 40 s ● 60 s
Airflow error delay time	Set the time delay for airflow faults. You can choose from the following: ● 15 sec ● 60 sec ● 120 sec ● 300 sec
Airflow supervision window	Set tolerances for airflow faults. You can choose from the following: ● ±20% ● (±30%) ● (±50%) ● (±80%)
Detector mode	Evaluation levels for detection. You can choose from the following: ● Automatic: switches between blue and blue-red based on ratio ● Robust ● Ultra sense: always blue ● Reserved

Field	Action
Smoke delay time	Set the alarm delay for smoke detection. You can choose from the following: [1] ● Device default ● 0 sec (EN54-20) ● 15 sec ● 60 s ● 120 sec ● 300 sec **For firmware versions ≤ 3.6:** To prevent false alarms, an alarm delay of '60 s' is set by default. For conformity to standards, the alarm delay can be reduced to '0 sec (EN54-20)'. **For firmware versions ≥ 3.10:** To prevent false alarms, an alarm delay of '0 s' is set by default.
Device test mode	Switch on / isolate test mode. You can choose from the following: ● Normal operation ● Test mode enabled

Following an alarm, flashing LED alarm indicators  on the aspirating smoke detector can only be reset via the fire control panel/fire terminal.

You will find more information in the following documents:

- For fire control panels FC20xx: Document 009078
- For fire control panels FC72x: Document A6V10210424

See also

Applicable documents [→ 9]

7.2 Standalone application

With the standalone option, the aspirating smoke detector is not connected to a fire control panel and is not configured using the configuration software for the FS20/FS720.

▷ The aspirating smoke detector is correctly installed.

▷ The aspirating smoke detector is correctly connected to an external power unit.

▷ The aspirating smoke detector is correctly connected to a pipe system.

▷ Communication transponder FDCC221S is not installed.

1. Switch the power supply on.
2. Carry out an LED and buzzer test. See 'LED and buzzer test [→ 89]'.
3. Carry out the required normalization [→ 90].

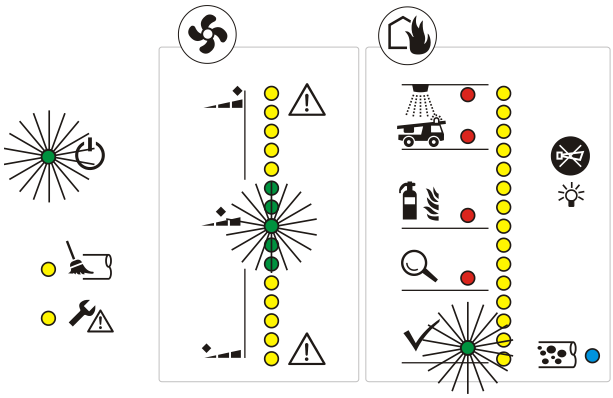
⇨ The aspirating smoke detector works with the basic settings.

⇨ If a fault occurs or the housing cover is open, the fault indicator flashes.

⇨ If the button is pressed when the housing cover is open, the buzzer switches off and the relay outputs are deactivated. The 4…20 mA analog output remains on fault.

⇨ The three green LEDs light up during normal operation.

Normal operation



Normal operation, green LEDs light up

Use the 'FXS2051 ASD Configuration Tool' software to change the basic settings.

See also

- Mounting [→ 58]
- Communication with the aspirating smoke detector [→ 94]
- Faults [→ 101]

7.3 Functional testing of the system

7.3.1 Functional testing of the system with an addressed detector line (FDnet/C-NET)

!	*NOTICE*
	Accidental triggering of an alarm Using smoke or aerosols for testing purposes may trigger an alarm unintentionally. • Make sure no alarm is sent to the fire brigade during the test.

▷ Communication transponder FDCC221S is installed.

▷ A smoke stick/aerosol spray is available.

1. Switch the relevant element on the fire detection system to test mode and follow the description in the 'Testing the detector" chapter of the fire detection system documentation.

   ⇨ The operating indicator  flashes.

2. Move the smoke/aerosol toward an aspirating hole in the pipe system.
   – Select an aspirating hole that is a long distance away if you want to test the response time as well.
3. Check whether an alarm is indicated on the front indicator.
4. Check whether an alarm has been transmitted to the fire control panel.
5. Wait until the smoke indicator has dropped to no more than 5 LEDs.
6. Reset the alarm on the fire control panel and quit test mode.

⇨ That is the end of the test.

7.3.2 Functional testing of the system with the standalone option

!	*NOTICE*
	Accidental triggering of an alarm Using smoke or aerosols for testing purposes may trigger an alarm unintentionally. • Make sure no alarm is sent to the fire brigade during the test.

Testing without alarm transmission/triggering of an alarm

▷ Communication transponder FDCC221S is not installed.

▷ A smoke stick/aerosol spray is available.

▷ A connected fire detection installation must be configured as appropriate for the test.

1. Open the housing cover. [→ 46]

   ⇨ The front indicator indicates a fault .

   ⇨ The relay outputs are active and the 'Smoke 4…20 mA' analog output has been switched to fault (0.5 mA).

2. If the relay outputs are to be deactivated for this test, press the  button. Observe the information on page [→ 46].

3. Move the smoke/aerosol toward an aspirating hole in the pipe system.
   – Select an aspirating hole that is a long distance away if you want to test the response time as well.

4. Check whether the smoke indicator [→ 24] rises fully and whether the internal indicator [→ 28] displays 'Alarm'.

5. Wait until the smoke indicator has dropped to no more than 5 LEDs.

6. Close the housing cover.
   ⇨ The fault indicator goes out.

⇨ That is the end of the test.

Testing with alarm transmission/triggering of an alarm

▷ Communication transponder FDCC221S is not installed.

▷ The relay outputs are activated.

▷ A smoke stick/aerosol spray is available.

▷ A connected fire detection installation and the connected alarm devices must be configured as appropriate for the test.

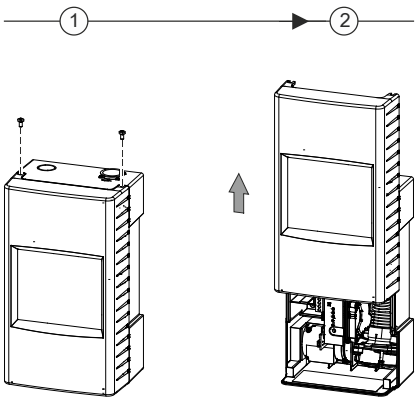
1. Move the smoke/aerosol toward an aspirating hole in the pipe system.
2. If you wish to measure the response time at the same time, please note the following:
   – Select an aspirating hole that is a long distance away if you wish to test the response time.
   – Measure how long it takes for the smoke indicator to display 'fire alarm 1'.
   ⇨ The time measured is the response time.
3. Check whether an alarm is indicated on the front indicator and whether the buzzer is activated. [→ 24]
4. Press the  button briefly to switch off the buzzer.
5. Check the following:
   – The alarm devices connected via relays indicate an alarm.
   – The 'Smoke 4…20 mA' analog output indicates the relevant current. [→ 66]
6. Wait until the smoke indicator has dropped to no more than 5 LEDs.
7. With self-retention activated:
   – Open the housing cover. [→ 46]
   – Press the  button to reset the detector status. [→ 28]
   – Close the housing cover.
   ⇨ The fault indicator goes out.

⇨ That is the end of the test.

7.4 Testing the indication of faults on the front indicator/internal indicator

To test the indicator, the housing cover can be opened so that the fault indicator flashes. The 'internal indicator' is visible. When you close the housing cover, the fault indicator goes out. See also chapter 'Opening and closing the housing cover when the power supply is switched on [→ 46]'.

!	*NOTICE*
	Electrostatic discharge Damage to electronic components in the aspirating smoke detector • When working on the open aspirating smoke detector, use anti-static floor mats and anti-static work surfaces. • Ground yourself immediately before opening the housing, e.g. by touching a ground point or wearing an anti-static belt.



Opening the housing cover

Opening the housing cover

▷ The housing is free from dust.

1. Remove the two screws on the top of the aspirating smoke detector using a size 2 Phillips screwdriver (step 1).
2. Slide the housing cover in the direction of the arrow until it snaps into place (step 2).
   - ⇨ The housing cover is open.
   - ⇨ Opening of the housing is logged in the modification memory.
   - ⇨ The fault indicator flashes and the buzzer is switched on.
   - ⇨ The relay outputs remain active and the 4…20 mA analog output has been switched to fault (0.5 mA).
3. Press the button to switch off the buzzer.
   - ⇨ The relay outputs are deactivated.
   - ⇨ The 4…20 mA analog output remains on fault.

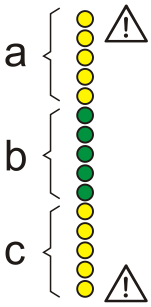
⇨ The housing cover is open.

7.5 Testing the airflow

At the time of commissioning, the airflow through the aspirating smoke detector is measured and this value is saved (normalization [→ 90]). During operation, the aspirating smoke detector measures the current airflow continually. The current measured value is compared with the saved measured value and any deviations are indicated on the airflow indicator.

If the current value matches the standard value, the central LED lights up green.

In the event of deviations, the LED moves up (higher airflow) or down (lower airflow). When the topmost or bottommost LED is reached, it starts to flash once the alarm delay time has expired.

Display	Designation	Function
	a) LED yellow	If a yellow LED lights up, the airflow has increased. ● As the deviation increases, the light moves upwards. If the topmost LED flashes, the airflow has exceeded the upper limit and the alarm delay time has expired.
	b) LED green	One of the green LEDs lights up. The airflow is normal.
	c) LED yellow	If a yellow LED lights up, the airflow is too low. ● As the deviation increases, the indicator moves downwards. If the bottommost LED flashes, the airflow has fallen below the lower limit and the alarm delay time has expired.

The 'FXS2051 ASD Configuration Tool' software can be used among other things to display the current airflow in [l/min]/[cfm]. The values displayed can provide information about faults. Possible causes of an airflow fault are leaks or blockages in the pipe system.

Possible types of leak:

- Cracks in the pipe
- Loose connections

Possible types of blockage:

- Particles at the aspirating hole
- Deposits in the pipe
- Condensation water
- Ice

You will find more information in the 'Checking the pipe system [→ 93]' chapter.

Large deviations in the airflow outside the set limit parameters

If the airflow is outside the set limit parameters (e.g., ±20 %), the fault relay is activated. In the event of other deviations, the LED on the fault indicator lights up and the device reports a fault on all connected interfaces.

The behavior described is identical in the case of standalone mode and operation on an FDnet/C-NET detector line.

If the aspirating smoke detector is operated on an FDnet/C-NET detector line, a message is also transmitted to the fire control panel.

The value for the deviation can be configured with the 'FXS2051 ASD Configuration Tool' software.

See also

- 'Fault' relay output for error messages [→ 69]
- Table of faults [→ 102]

7.6 Testing the response time

The response time is the time it takes for the smoke indicator to respond after smoke enters an aspirating hole [→ 24].

The 'FXS2051 ASD Configuration Tool' software can be used to set the alarm delay and the tolerance for airflow deviations.

▷ A smoke stick/aerosol spray is available.

▷ The fire detection system has been switched to maintenance mode.

1. Move the smoke/aerosol toward the aspirating hole at the end of the pipe system.
2. Measure the response time (the time it takes for the smoke detector on the aspirating smoke detector to change).
3. Compare the measured response time with the amount of time you know it should take for the detector to respond.
   - On initial installation, compare the response time with the response time calculated by the 'FXS2055 ASD Asyst Tool' software. For details, see document A6V10340094.
   - In the case of subsequent measurements, compare the response time with the response time that was measured after successful normalization as part of first commissioning.

⇨ If the measured response time deviates by more than 15 %, the pipe system must be checked.

- To check the pipe system, proceed as follows:
  - All aspirating holes must be clear.
  - The pipe system must not be blocked.
  - All pipe connections must be tight.
  - The pipe system must not have any cracks or fractures in it.
  - You will find more information in chapter 'Checking the pipe system [→ 93]'.

7.7 Checking and testing the power supply units

The power supply units must be checked and tested in accordance with the manufacturer's instructions, both on first commissioning and at regular intervals.

7.8 LED and buzzer test

During the test, the following is checked:

- Function test of the detector indicator
- LED light test in three brightness levels
- Sound of the buzzer at three different sound levels

The test is activated with the button and the result indicated with the LEDs.

▷ The aspirating smoke detector is ready for use.

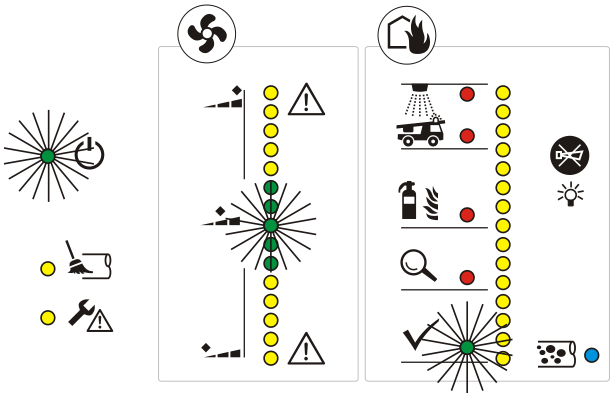
- Press the button for 5 seconds.
  - ⇨ The LED and buzzer test is carried out. The test is automatically undertaken in three stages.
  - – **Stage 1:** All the LEDs light up consecutively for one second at full brightness. The buzzer sounds loudly.
  - – **Stage 2:** All the LEDs light up consecutively for one second at reduced brightness. The buzzer sounds quieter.
  - – **Stage 3:** All the LEDs light up consecutively for one second at faint brightness. The buzzer sounds quietly.

⇨ The fault indicator lights up briefly. If a fault is present, the corresponding LED indicator lights up at the same time for 3 seconds for Fault analysis [→ 104].

⇨ The indicators go out once the test has been completed successfully.

⇨ If a fault is present, the fault indicator flashes.

⇨ During normal operation, the three green LEDs light up.



Normal operation, green LEDs light up

See also

- Fault analysis [→ 104]
- Normalization [→ 90]
- Table of faults [→ 102]

7.9 Normalization

During normalization, the aspirating smoke detector is set to the prevailing usage and ambient conditions. This setting cannot be made during detector production.

Example: The ambient conditions prevailing in the industrial zone of a large city where there is a lot of air pollution will be very different from those found in a climatic spa town.

During normalization, current airflow values or smoke values are determined over a long period of time. The values are permanently averaged and saved as zero reference. If the housing cover is closed, the aspirating smoke detector is still fully capable of alarms during normalization.

The duration of normalization can be configured with the 'FXS2051 ASD Configuration Tool' software.

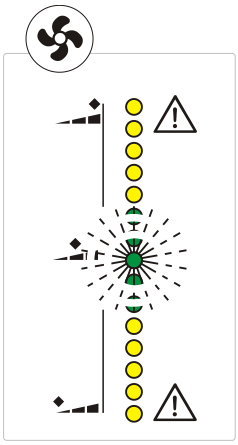
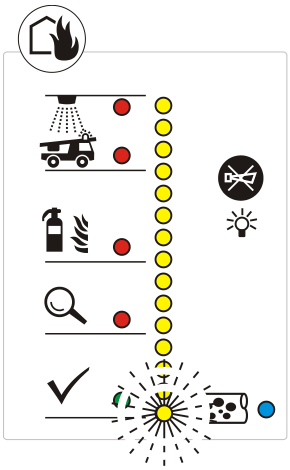
▷ The aspirating smoke detector is connected to the pipe system.

▷ The aspirating smoke detector is connected to an external power unit.

▷ The housing cover is open.

The 'Normalize Flow' and 'Normalize Smoke' buttons can only be actuated using a suitable, thin tool, e.g. a pen or a paper clip.

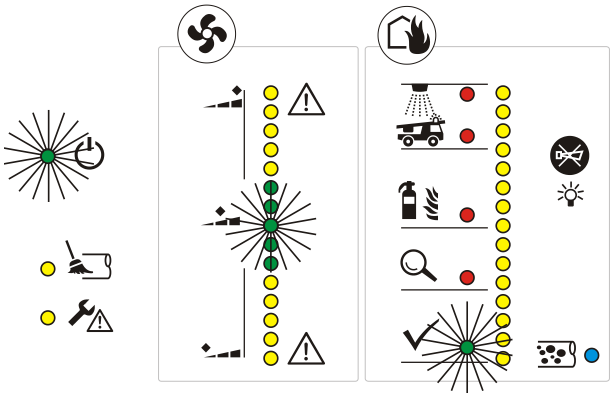
- To activate normalization, press the corresponding button on the interface card [→ 29]:
  - Press the ○ Normalize Flow button to normalize the airflow.
  - Press the ○ Normalize Smoke button to normalize the smoke value.
  - ⇨ The associated LED flashes while the normalization is running.
  - ⇨ Normalization starts and completes after approximately 1 hour.
  - ⇨ For devices with firmware version ≥3.10: The LED indicator for the airflow on the bar graph moves into the central position immediately.
  - ⇨ For devices with firmware version ≤3.6: The LED indicator for the airflow on the bar graph moves into the central position very slowly.
  - ⇨ The LED indicator for the smoke moves into the lowest position.
  - ⇨ During normalization, the bar graph for the airflow indicates the deviation of the current measured airflow value from the averaged value (zero reference).
  - ⇨ When operating on a FDnet/C-NET detector line: The current normalization process is displayed on the fire control panel.

	
The airflow is being normalized. **For firmware version ≥3.10:** The central LED flashes. If another LED on the bar graph flashes, this indicates the deviation of the current measured value from the averaged value	The smoke value is being normalized. The LED flashes and the yellow LEDs go out one by one.

If normalization was successful, the aspirating smoke detector switches to normal operation and the three green LEDs light up constantly.

Also observe the notices relating to normalization in the table of faults [→ 102].

Normal operation



Normal operation, normalization is finished. The LEDs light up constantly.

Normalization over a period <1 h

Recommendation: Normalization should be carried out over a period ≥ 5 minutes to avoid false measurements occurring later on when operating the aspirating smoke detector.

To cancel normalization manually, press the ○ Normalize Flow button again.

Limits of the normalization of the airflow (only for firmware versions ≥ 3.10)

The normalization process can only be carried out within a defined range for the airflow values. Please refer to the following table for the limits of the range:

Device	Lower limit for the airflow	Upper limit for the airflow
FDA241	15 l/min	57 l/min
FDA221	15 l/min	48 l/min

If the airflow to be normalized is outside the permitted range, the aspirating smoke detector indicates a general fault during normalization and normalization is canceled:

- The fault indicator lights up.
- The 'Fault' relay output [→ 69] opens.
- The buzzer sounds continuously.
- If the aspirating smoke detector is operated on a FDnet/C-NET detector line, a message is transmitted to the control panel.

The LED on the bar graph also shows the deviation from the upper or lower limit.

!	*NOTICE*
	No normalization of the aspirating smoke detector False alarms due to false measurements • Only use normalized detectors for fire detection.

See also

Opening and closing the housing cover when the power supply is switched on [→ 46]

8 Maintenance / Repair

8.1 Visual inspection

Check the following:

- Assuming the pipe system is freely accessible, check it is securely attached and free of damage.
- The aspirating holes of the pipe system are clear.
- The intake pipe and connecting cables are securely connected.
- The device retainer (if present) has been correctly secured.
- The smoke aspiration system is free of damage. See also 'Fault indication [→ 109]'.

8.2 Checking the pipe system

In areas that are prone to dust particles or freezing, check whether the aspirating holes of the pipe system are blocked. Blow out the pipe system and the aspirating holes (using compressed air, if necessary). To do this, use a portable compressed air cylinder (blowing-out equipment) or a permanently installed manual blowing-out system.

8.3 Status queries with service devices

If the aspirating smoke detector is connected to the FDnet/C-NET detector line via communication transponder FDCC221S, line tester FDUL221 can be used.

You will find a detailed description of line tester FDUL221 in document 008250.

The aspirating smoke detector can communicate directly with detector exchanger and tester FDUD292 or intelligent detector tester FDUD293 via the MC link interface on the communication transponder.

You will find a detailed description of these test devices in documents 007227 and 009718.

All the relevant settings can be made with the 'FXS2051 ASD Configuration Tool' software. The PC communicates with the aspirating smoke detector.

For more information, please refer to document A6V10332759.

See also

Applicable documents [→ 9]

8.3.1 Communication with the aspirating smoke detector

Establishing connection between aspirating smoke detector and PC

The 'FXS2051 ASD Configuration Tool' software closes automatically when the connection cable is loosened or when the aspirating smoke detector's power supply is interrupted.

The power supply for the aspirating smoke detector must not be interrupted while the detector firmware is being updated.

▷ The software is installed on the PC.

▷ The aspirating smoke detector's power supply must be ensured for the duration of the connection. The 'FXS2051 ASD Configuration Tool' software must be restarted if an interruption occurs.

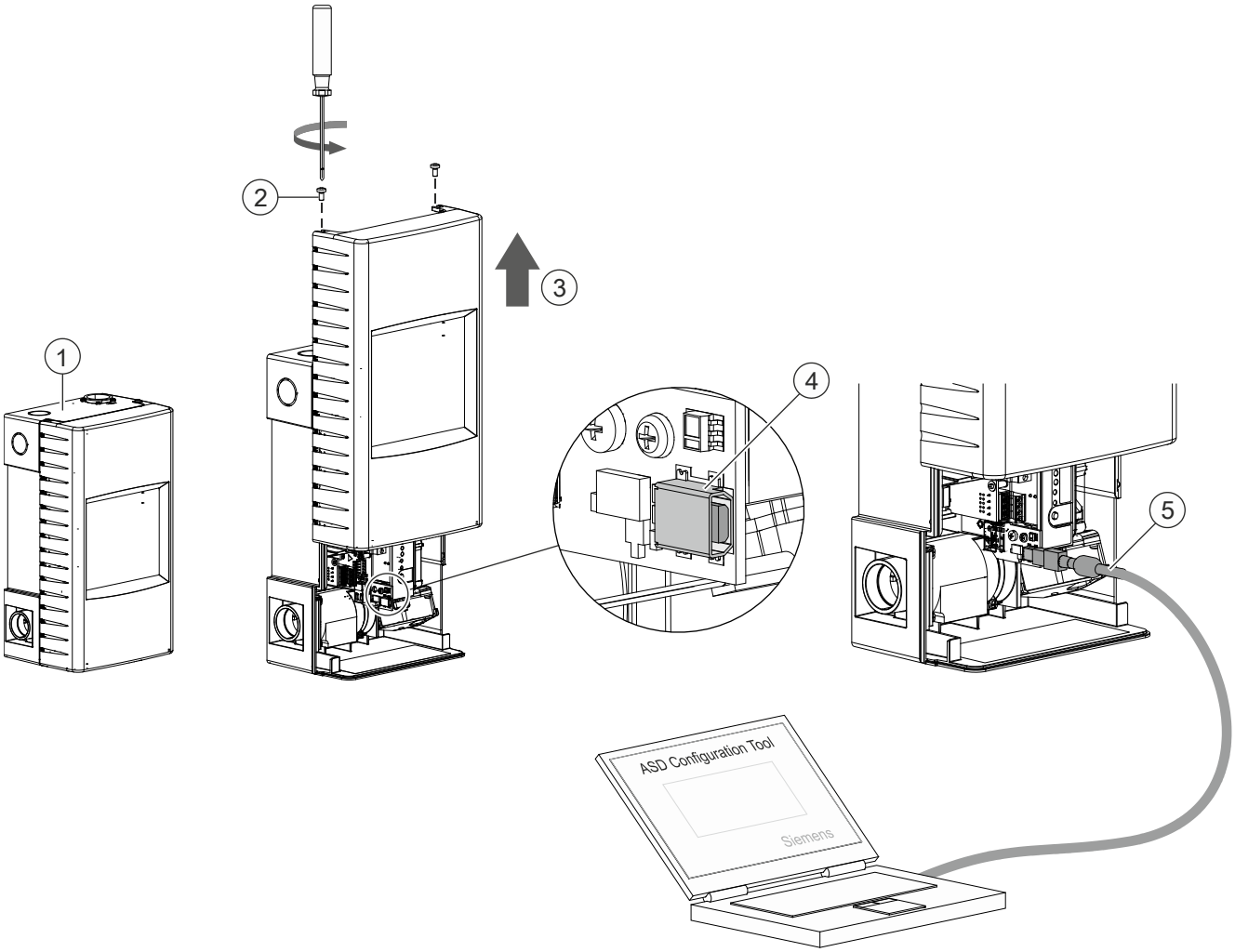
▷ The PC has a USB port type A.

▷ A connection cable with a USB connector type A and a 5-pole USB connector type mini B is available.

1. Open the housing of the aspirating smoke detector (1).
   – Remove the two screws (2) on the housing cover.
   – Slide the housing cover in the direction of the arrow until it snaps into place (3).
   ⇨ The port (4) for the USB connector type mini B is visible.
   ⇨ The ○ fault indicator flashes and the buzzer sounds.
2. Press the button briefly to switch off the buzzer.
   ⇨ The outputs are deactivated.
3. Connect the aspirating smoke detector (1) to the PC using the connection cable (5).
4. Start the software.

⇨ Communication between the software and aspirating smoke detector (1) is possible.

Select the COM port in the software: 'Options' > 'Preferences' > 'Device' > 'Serial Port'.



Connecting the aspirating smoke detector to a PC

1 Aspirating smoke detector
2 Screw connection between housing cover and back box
3 Slide housing cover
4 Mini USB interface
5 Connection cable

Disconnecting connection between aspirating smoke detector and PC

▷ The PC is connected to the aspirating smoke detector and the software is activated.

▷ Changed settings and data are saved.

1. Close the software in the 'File' main menu with the 'Exit' command.
2. Remove the connection cable (5) from the aspirating smoke detector (1).
3. Slide the housing cover in the opposite direction to the arrow (3) and back into its starting position.

   ⇨ The housing of the aspirating smoke detector (1) is closed.

4. Tighten the two screws (2).

⇨ The aspirating smoke detector (1) is ready for use.

The 'FXS2051 ASD Configuration Tool' software closes automatically when the connection cable is loosened or when the aspirating smoke detector's power supply is interrupted.

See also

Opening and closing the housing cover when the power supply is switched on [→ 46]

8.4 Resetting status displays and relay outputs (standalone option)

This section only applies to the standalone option.

In standalone operation, the detector is 'self-retaining' (default), but it can also be configured as 'not self-retaining'.

Self-retaining functions:

- Airflow faults
- All alarms

In the event of airflow faults, the topmost or bottommost yellow LED flashes accordingly.

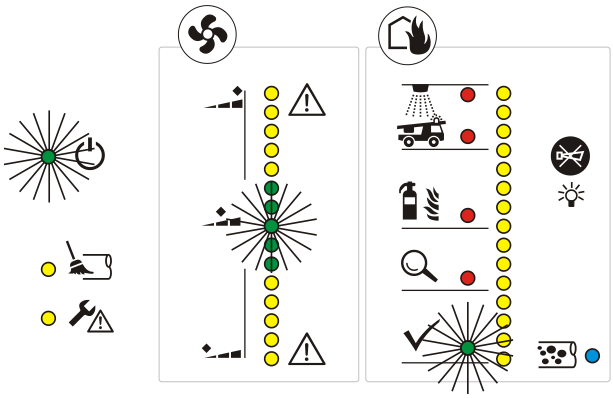
Resetting the status display and self-retaining mode

▷ The housing cover is open.

- Press the Reset button.

⇨ The indication of airflow faults is reset when the airflow returns to the normal range.

⇨ The alarms are reset when the smoke value returns to the normal range.



The LEDs light up constantly.

8.5 Performance check

The front indicator and the internal indicator provide information about the aspirating smoke detector's current status. The function of the front indicator can be checked with a test. See 'LED and buzzer test'. [→ 89]

All the relevant settings can be read with the 'FXS2051 ASD Configuration Tool' software. The PC communicates with the aspirating smoke detector.

You will find more information in document A6V10332759.

See also

Applicable documents [→ 9]

8.6 Cleaning

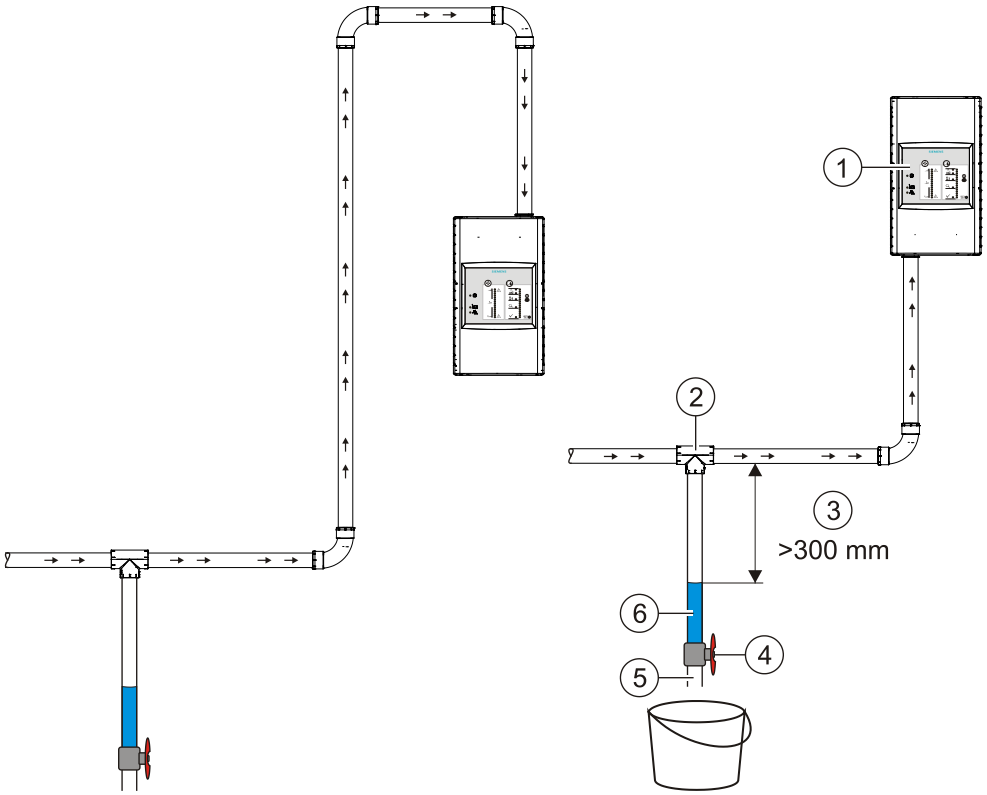
Use a damp cloth to clean the housing. Do not use chemical cleaning agents.

8.7 Carrying out water trap maintenance

The condensation water that has been collected must not enter the airflow.

The procedure for draining the water trap varies according to the design. Observe the following information:

- Check the water level regularly. Base the maintenance interval on the usage conditions to ensure compliance with the mandatory minimum distance (> 300 mm) between the surface of the water and the airflow.
- Condensation water must never be allowed to enter the airflow. Therefore, you should switch off the aspirating smoke detector before carrying out drainage or should close the connection between the condensation water and the airflow while carrying out the procedure.
- If an open connection to the pipe system occurs during drainage, the aspirating smoke detector will interpret the open connection as a fault. In this case, switch off the aspirating smoke detector while draining the water.
- An error message on the aspirating smoke detector can be avoided if the connection only remains open very briefly (<2 seconds).



Example of how to arrange a water trap

→→	Airflow		
1	Aspirating smoke detector with front indicator that is rotated by 180°	4	Valve for draining condensation water
2	T-fitting for connecting the water trap at a low horizontal point within the pipe system	5	Outlet opening
3	Distance between manifold and surface of the water > 300 mm	6	Condensation water

8.8 Maintenance and cleaning intervals

The intervals for blowing out the pipe system depend on the level of dirt or may be defined as fixed time intervals. The setting can be made manually or automatically.

The setting is made in the 'Purge' menu with the 'FXS2051 ASD Configuration Tool' software.

Maintenance intervals

Preventive maintenance involves carrying out regular inspections and maintenance work. The smoke gas systems must be checked for the first time during commissioning and then once every six months. Extended checks must be carried out annually. As a result, the following categories of check apply:

- Ad hoc check
  - If the yellow LEDs light up on the airflow indicator [→ 24], clean the aspirating holes by blowing them out [→ 44].
  - If the pipe systems are equipped with a water trap, check the water level. Follow the instructions for carrying out water trap maintenance [→ 33].
- Six-monthly check
  - Inspection
- Annual check
  - Inspection and maintenance

Interval	Type of check	Measures
Six-monthly	Inspection	● Visual inspection [→ 93] ● Check detector module and alarm transmission [→ 83] ● Check pipe system [→ 93] ● Check fault forwarding [→ 83] ● Carry out LED and buzzer test [→ 89]
Annually	Inspection and maintenance	● Visual inspection [→ 93] ● Check detector module and alarm transmission [→ 83] ● Check pipe system [→ 93] ● Check fault forwarding [→ 83] ● Carry out LED and buzzer test [→ 89] ● Check response time by carrying out a smoke test, compare this with previous checks, and investigate any discrepancies [→ 88] ● Check and test power supply units in accordance with the manufacturer's instructions [→ 89]

8.9 Event memory

Various changes/events that are not activated or controlled directly by a person are written to the aspirating smoke detector's event memory.

The table below shows which events are stored in the event memory:

Event	Meaning of the saved value
Status changed	Aspirating smoke detector's status has changed (e.g. alarm, error).
Airflow changed	The airflow value has changed by more than 3 LEDs on the front indicator.
Smoke changed	The smoke value has changed by more than 2 LEDs on the front indicator.
Temperature changed	The temperature has changed by more than 5 °C.
Power supply changed	The operating voltage has fallen below 24 V.
Purge state changed	The purge state has been changed, e.g. from 'Off' to 'On' during automatic blowing out.

The event memory can be read via the mini USB interface and the 'FXS2051 ASD Configuration Tool' software. The events are listed and separated from one another by commas.

8.10 Modification memory

Various changes/events that are activated or controlled directly by a person are written to the aspirating smoke detector's modification memory.

The table below shows which events are stored in the modification memory:

Event	Meaning of the saved value
Device reset	The aspirating smoke detector was restarted/switched on again
Tool connected	The 'FXS2051 ASD Configuration Tool' software was connected via the mini USB interface
Access level changed	● Access rights changed ● Housing cover opened ● Password entered
Settings changed	Settings for the detector line were changed.
Property changed	Configuration was changed.
FW changed	Firmware was changed.
Button pressed	Button was pressed. ● Buzzer off ● Airflow normalization ● Normalization smoke value
Time changed	Time was overwritten by restart.

The modification memory can be read via the mini USB interface and the 'FXS2051 ASD Configuration Tool' software. The events are listed and separated from one another by commas.

8.11 Faults

Faults are signaled on the front indicator. If there is any uncertainty, we recommend carrying out an LED and buzzer test.

During the test, the following is checked:

- Function test of the detector indicator
- LED light test in three brightness levels
- Sound of the buzzer at three different sound levels

The test is activated with the button and the result indicated with the LEDs.

▷ The aspirating smoke detector is ready for use.

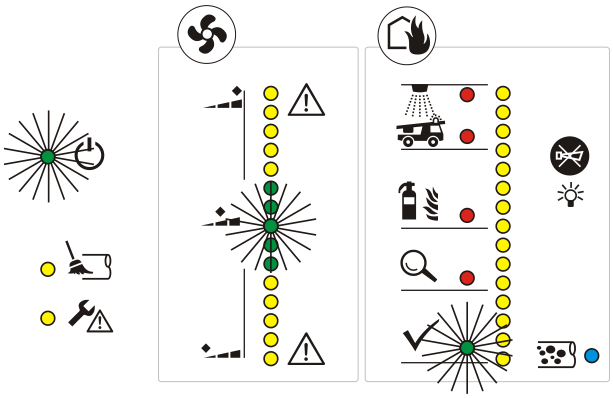
- Press the button for 5 seconds.
  - ⇨ The LED and buzzer test is carried out. The test is automatically undertaken in three stages.
  - – **Stage 1:** All the LEDs light up consecutively for one second at full brightness. The buzzer sounds loudly.
  - – **Stage 2:** All the LEDs light up consecutively for one second at reduced brightness. The buzzer sounds quieter.
  - – **Stage 3:** All the LEDs light up consecutively for one second at faint brightness. The buzzer sounds quietly.

⇨ The fault indicator lights up briefly. If a fault is present, the corresponding LED indicator lights up at the same time for 3 seconds for Fault analysis [→ 104].

⇨ The indicators go out once the test has been completed successfully.

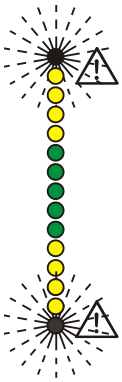
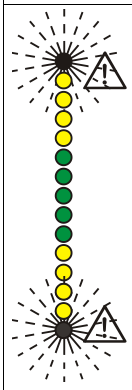
⇨ If a fault is present, the fault indicator flashes.

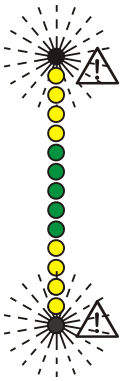
⇨ During normal operation, the three green LEDs light up.



Normal operation, green LEDs light up

8.11.1 Table of faults

Fault/problem	Possible cause	Remedy
The aspirating smoke detector is not detected by the fire control panel	Order not observed when switching on/starting	Switch the detector line off. Switch the aspirating smoke detector's external power unit on. Then restart the detector line.
Airflow indicator is not moving from the yellow area to the green one. Current airflow is above the upper limit value.	Hole or crack in the pipe system	Check the pipe system for damage, e.g., cracks, holes, loose connections between the pipes and fittings.
Airflow indicator is not moving from the yellow area to the green one. Current airflow is below the lower limit value.	Pipe system blocked	Blow out the pipe system.
 LED flashes. The other indicators light up green.	Localization is underway on the fire control panel	End localization on the fire control panel.
 LED flashes	Test mode active	Deactivate test mode on fire control panel
 LEDs flash at the same time	Hardware defect on the airflow sensor	Replace the aspirating smoke detector.
 Topmost or bottommost LED flashes	Airflow has reached the configured tolerance limit (typically ±20 %).	Check the pipe system for damage, e.g., cracks, holes, loose connections between the pipes and fittings. Blow out the pipe system. Normalize the aspirating smoke detector.

Fault/problem		Possible cause	Remedy
 Topmost or bottommost LED flashes	 LED lights up	Additional deviation in the airflow outside the set limit parameters.	Check the pipe system for damage, e.g., cracks, holes, loose connections between the pipes and fittings. Blow out the pipe system. Normalize the aspirating smoke detector.

If connected to FDnet/C-NET:

Following an alarm, flashing LED alarm indicators  on the aspirating smoke detector can only be reset via the fire control panel/fire terminal.

See also

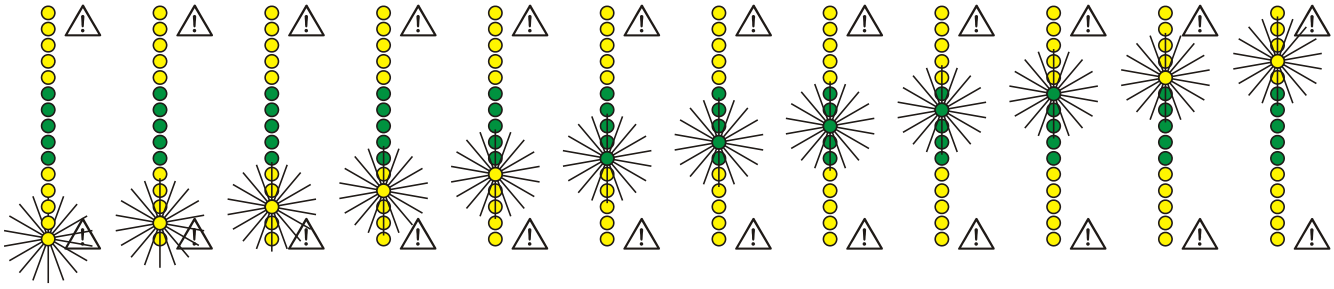
- Fault analysis [→ 104]
- LED and buzzer test [→ 89]

8.11.2 Fault analysis

The ● 🔧⚠ indicator lights up when faults occur. The fault type is indicated when called.

To do this, perform a LED and buzzer test [→ 89]. When the LED test sequence has finished, the "fault indicator" lights up together with the relevant LED for approximately 3 seconds.

Fault types



Light position

Light position	Fault type
1	Detector component defective
2	Indicator control defective
3	Detection chamber defective
4	Relay connection defective
5	4…20 mA connection defective
6	Invalid smoke detector configuration
7	Air aspiration/air flow measurement fault
8	GPI connection configured incorrectly
9	GPI wiring faulty
10	Incorrect configuration
11	Power supply fault
12	Housing cover open

You will find a graphic containing the fault types in the Annex [→ 109]. The graphic can be printed out and kept right next to the LEDs. This makes it easier to identify the fault type.

See also

Table of faults [→ 102]

9 Specifications

9.1 Technical data for FDA241, FDA221

You will find information on approvals, CE marking, and the relevant EU directives for this device (these devices) in the following document(s); see 'Applicable documents' chapter:

- Document A6V10331032

External power supply requirement	Standards:	Tested to EN 54-4 [1]
	Operating voltage (output):	DC 19…30 V
	Operating current (output):	• 150 mA nominal • 250 mA for detector during alarm

[1] Power supplies compliant with EN 54-4 have an output voltage of 20.0…30.0 V.
The power supply is switched off to prevent total discharge of the batteries.
The aspirating smoke detectors FDA241 and FDA221 issue a warning when a voltage of 21 V is reached before switching off the power supply:

- The FAULT relay is activated.
- During operation on an FDnet/C-NET detector line, a message appears on the control panel.

,

Sound power level L_{WA} [dBA]

A-weighted sound power level in [dB] as per DIN EN ISO 3744-2009, measured with a pipe piece at the air inlet and at the air outlet

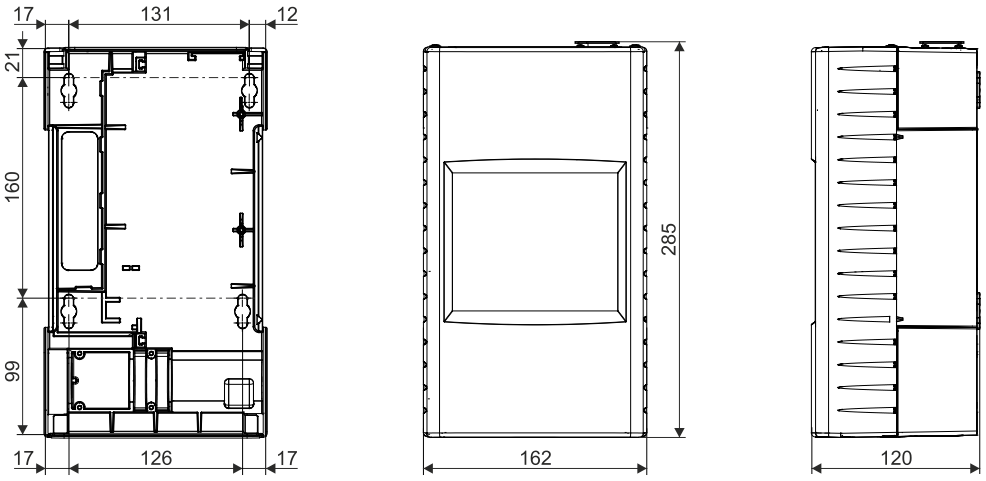
At suction speed	High	• 37 (FDA241) • 33 (FDA221)
	Medium	• 33 (FDA241) • 30 (FDA221)
	Low	• 30 (FDA241) • 26 (FDA221)

Connections and interfaces	Relay alarm output can be selected with or with out self-retention, contact:	Max. DC 30 V, max. 2 A
	Number of relay alarm outputs for	
	• FDA241	4
	• FDA221	3
	Number of fault relay outputs	1
	GPI (relay output for separate cleaning unit)	Available
	Purge (relay output for high dust concentrations)	Present on the FDA241
	Dust	Present on the FDA241
	Terminal version	Screw terminals
	Cables	Fire class V1
	Cable cross section	0.2…2.5 mm² (AWG 12…30)
	Interface	4…20 mA

	Interface for connecting to a PC	Mini USB
	Connection to detector line with FDCC221S (accessory)	FDnet/C-NET
	Connection factor with FDCC221S (accessory)	3
Line separator	Line voltage:	
	● Nominal	DC 32 V (= V_{nom})
	● Minimum	DC 12 V (= V_{min})
	● Maximum	DC 33 V (= V_{max})
	Voltage at which the line separator opens:	
	● Minimum	DC 7.5 V (= $V_{SO\ min}$)
	● Maximum	DC 10.5 V (= $V_{SO\ max}$)
	Permanent current when switches are closed	Max. 0.5 A (= $I_{C\ max}$)
	Switching current (e.g., in the event of a short-circuit)	Max. 1 A (= $I_{S\ max}$)
	Leakage current when switches are open	Max. 1 mA (= $I_{L\ max}$)
	Serial impedance when switches are closed	Max. 0.5 Ω (= $Z_{C\ max}$)
Parameter sets	Number of parameter sets (see also [→ 40])	
	FDA241	10 sets
	FDA221	5 sets
Sensitivity	For early warning alarm, pre-alarm, fire alarm 1 (see also [→ 40])	
	FDA241	0.03…2.0 %/m obs
	For pre-alarm, fire alarm 1 (see also [→ 40])	
	FDA221	0.08…2.0 %/m obs
	For fire alarm 2 (see also [→ 40])	
	FDA241	2.0…20 %/m obs
	FDA221	6.0…20 %/m obs
Alarm delay	Can be set individually	0…300 seconds
	Default setting	● 0 seconds (firmware version ≥ 3.10) ● 60 seconds (firmware version ≤ 3.6)
	EN 54-20	● 0 seconds

Pipe system	Pipe outer diameter	25 mm
	Inner diameter of pipe	21 mm
	Maximum piping lengths for FDA241:	
	● Single line	FDA241: 60 m
	● Branched lines	FDA241: 2 x 60 m
	Maximum piping lengths for FDA221:	
	● Single line	30 m
	● Branched lines	2 x 25 m
Monitored surface	The maximum permissible surface depends on the locally valid regulations!	
	Maximum surface:	
	● FDA241	800 m²
	● FDA221	500 m²
Compatibility (FDCC221S installed)		
	Compatible with fire control panels	FC20xx/FC72x
Ambient conditions	Operating temperature	-20…+60 °C
	Storage temperature	-30…+70 °C
	Air humidity	5…95 % rel., no moisture condensation
	Protection category (IEC 60529):	
	● FDA241	IP30
	● FDA221	IP30
Mechanical data	Weight	approx. 1.5 kg
	Housing material	ABS/PC
	Housing color	~RAL 9010 pure white
Standards	European standards	● EN 54-20 A, B, C ● EN 54-17 with FDCC221S installed

9.2 Dimensions



Dimensions of the aspirating smoke detectors FDA241, FDA221

9.3 Environmental compatibility and disposal

This equipment is manufactured using materials and procedures which comply with current environmental protection standards as best as possible. More specifically, the following measures have been undertaken:

- Use of reusable materials
- Use of halogen-free plastics
- Electronic parts and synthetic materials can be separated

Larger plastic parts are labeled according to ISO 11469 and ISO 1043. The plastics can be separated and recycled on this basis.

Electronic parts and batteries must not be disposed of with domestic waste.

- Take electronic parts and batteries to local collection points or recycling centers.
- Contact local authorities for more information.
- Observe national requirements for disposing of electronic parts and batteries.

10 Annex

10.1 Fault indication

To make it easier to interpret the fault indicator, you can print this page and keep the graphic and description next to the LEDs that light up. To print this page, set your device to A4 paper without any scaling.

- -
- -
- -
- Housing cover open
- Power supply fault
- Incorrect configuration
- GPI wiring faulty
- GPI connection configured incorrectly
- Air aspiration/air flow measurement fault
- Invalid smoke detector configuration
- 4…20 mA connection defective
- Relay connection defective
- Detection chamber defective
- Indicator control defective
- Detector component defective

See also

Fault analysis [→ 104]

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