FAS-420 Series Aspirating Smoke Detectors LSN improved version

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Invented for life

▶ Connectable to the fire panels FPA-5000 and FPA-1200 with the improved LSN technology

▶ High deceptive alarm immunity with intelligent signal processing *LOGIC·SENS*

▶ Innovative airflow monitoring including single-hole monitoring detects obstruction and breakage

▶ Initial set-up made easy by automatic initialization

▶ Easy diagnostics through flash code on the Detector Module or by using the FAS-ASD-DIAG diagnostic software

The FAS-420 Series Aspirating Smoke Detectors are specially designed for direct connection to the Local SecurityNetwork LSN improved version with the extended features. They are active fire detection systems for early fire detection in area and equipment monitoring, as well as for the monitoring of air conditioning units or ducts.
They have the latest detection technology. Their resistance to contamination, the temperature compensation of the sensor signals and initialization in relation to air pressure ensure reliable operation even under extreme environmental conditions.
The SL-versions with extremely quiet fan are applicable for noise sensitive areas, for example hotel rooms, hospitals and bureaus. The noise was reduced to 38 dB(A) and up to 34 dB(A) with additional sound absorber.

System Overview
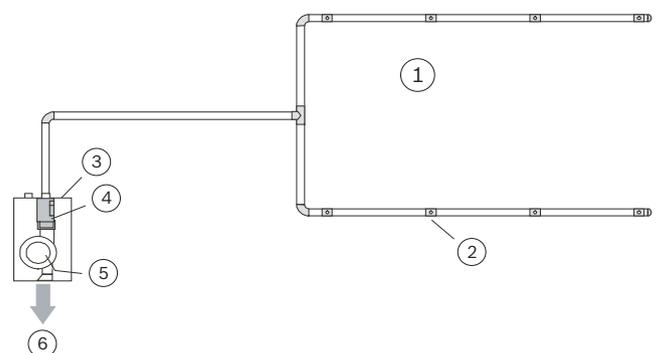
Pos.	Description
1	Pipe system/air intake
2	Air sampling openings
3	Housing
4	Detector Module incl. airflow sensor

5	Aspiration unit
6	Air outlet

Functions

The aspiration unit takes air samples from the monitoring area through a pipe system with defined air sampling openings and passes the samples to the Detector Module.

Depending on the response sensitivity of the used Detector Module, the Aspirating Smoke Detector triggers an alarm when the appropriate smoke density is reached. This alarm is displayed via the alarm LED on the unit and is transmitted to the fire panel.

An airflow sensor checks the connected pipe system for breakage and obstruction.

Intelligent signal processing *LOGIC·SENS* compares the measured smoke level with known disturbance variables and decides between alarm and deception. For the display and transmission of alarm and faults various delay times can be selected.

Each Detector Module is monitored for contamination, signal malfunction and device removal. Malfunctions and certain device states are displayed using various LED flash codes on the Detector Module's electronics PCB.

A fault message is reset via the connected fire panel. Via the Local SecurityNetwork LSN the alarm and fault messages on the unit are reset simultaneously with the detector line.

There are three different Detector Modules available for the FAS-420 Series Aspirating Smoke Detectors. These modules have different response sensitivities:

Detector Module	Max. sensitivity (light obscuration)	Levels for selection
DM-TT-50(80)	0.5 %/m (0.8 %/m)	2
DM-TT-10(25)	0.1 %/m (0.25 %/m)	4
DM-TT-01(05)	0.015 %/m (0.05 %/m)	4

> **i** **Notice**
> The sensitivity is based on the measurements during Standard Test Fires (previous measurement in brackets).

The FAS-420-TP2, FAS-420-TT2, FAS-420-TP2-SL and the FAS-420-TT2-SL runs with two Detector Modules. Two air sampling pipe systems can be connected to monitor two areas. When monitoring only one area with two pipe systems, dual-detector dependency may be implemented. Connection to the fire panels FPA-5000 and FPA-1200 and programming via FSP-5000-RPS also allows for dual-zone dependency.

Address allocation

The integrated DIP switches are used to select between automatic or manual addressing with or without auto detection.

The following settings are possible:

Address	Operating mode
0	Automatic addressing in improved version LSN mode for loop/stub (T-taps not possible)
1 – 254	Manual addressing in improved version LSN mode for loop/stub/T-taps
255	Automatic addressing in classic LSN mode for loop/stub (address range: max. 127)

Features of improved LSN

The Aspirating Smoke Detectors in the 420 Series offer all the features of the LSN technology improved version:

- Flexible network structures including T-tapping without additional elements
- Up to 254 LSN-improved elements per loop or stub line
- Unshielded cable can be used

In addition, the FAS-420 Series offer all the established benefits of LSN technology. Operating data and fault messages can be found on the panel controller. In the event of an alarm, individual detector identification is transmitted to the fire panel.

Model variants FAS-420 Series

The variants FAS-420-TP1 and FAS-420-TP2 are the cost-effective Aspirating Smoke Detectors for universal use with LED displays for operation, malfunction, and alarm (two alarm indications on the FAS-420-TP2). They are also available as silent versions FAS-420-TP1-SL and FAS-420-TP2-SL.

The FAS-420-TT1 and FAS-420-TT2 (FAS-420-TT1-SL and FAS-420-TT2-SL) offer differentiated alarm indications (info, pre, and main alarm) as well as a smoke level display in 10 levels (with the FAS-420-TT2 all alarm and smoke level displays are doubled). Depending on the used Detector Module, a resolution of the sensitivity indication of up to 0,0015 %/m, 0,01 %/m or 0,05 %/m can be selected.

Certifications and Approvals

Region	Certification	
Europe	CE	FAS-420-TP1/-TP2
	CE	FAS-420-TT1/-TT2
Germany	VdS	G 208046 FCS-320 TT_TPSeries / FAS-420 TT_TPSeries
Europe	CPD	0786-CPD-20790 FCS-320-TPx_FCS-320-TTx_FAS-420-TPx_FAS-420-TTx
Switzerland	VKF	AEAI 19207 FAS-420 LSNi

Installation/Configuration Notes

- For connection to the fire panels FPA-5000 and FPA-1200 with the extended system parameters of LSN improved version.
- Programming is carried out via RPS.
- The fan requires a separate power supply.
- An external detector alarm display for connection to the FAS-420 Series Aspirating Smoke Detectors can be ordered separately.

Planning of the pipe system
- In planning, a distinction is made between area monitoring and equipment monitoring.
- PVC pipes and halogen-free aspiration pipes can be used.
- For equipment monitoring, halogen-free pipes should be used.
- The air sampling pipe system should be arranged such that any fires can be detected at the initial stage.
- The pipe system including air sampling openings must always be symmetrical in design (±10% deviation).
- If structural issues make it impossible to maintain this symmetry, the following conditions apply:
  - The number of air sampling openings and the length of the shortest and longest pipe branch within the pipe system must not exceed a quantity ratio of 01:02.
  - The distance between neighboring air sampling openings on the aspiration pipe must be even (max. deviation ± 20%).
  - The diameters of the air sampling openings are determined separately for each pipe branch. The diameters depend on the total number of air sampling openings in the pipe branch in question.
- Greater distances between the Aspirating Smoke Detector and aspiration pipe are specified for pipes with a 40 mm diameter.
- Depending on the geometrics of the area, the I-, U-, M- or double U-pipe system is utilized.

> **i Notice**
>
> Take notice when planning that the fans of the Aspirating Smoke Detectors produce a noise level of 45 dB(A).
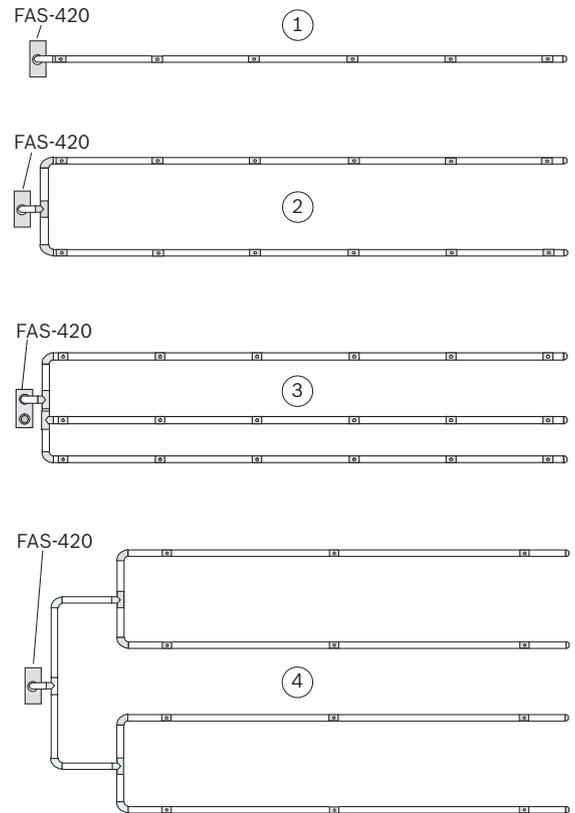
Pos.	Designation
1	I-pipe system
2	U-pipe system
3	M-pipe system
4	Double U-pipe system

- For a faster detection, it is best to select several short branches rather than a few long branches (U and double-U pipe systems preferable).
- Bends are preferable to angles in the event of directional changes.
- In order to increase transport speed in critical application areas, the fan voltage can be increased from 6.9 V to 9 V.

Planning limitations
- Pipe length between two air sampling openings:
  - Minimum 4 m (0.1 m with Simplified Pipe Planning)
  - Maximum 12 m.
- The maximum monitoring area per air sampling opening corresponds to the maximum monitoring area of point-type detectors according to valid planning guidelines.
- Maximum of 32 air sampling openings per pipe system
- Max. pipe length / max. total monitoring area per pipe system:
  - **300 m / 2880 m^2** (VdS-compliant)
  - With two Detector Modules: **2*280 m / 5760 m^2**

Aspiration pipe planning

Aspiration pipe systems are constructed according to planning specifications with the common pipe components as well as components for special applications, e. g. Water Separator or Detonation Safety Barrier.

All borings for the smoke aspiration systems are made to a diameter of 10 mm and the exact aspiration openings are implemented by means of the patented Aspiration Reducing Film Sheets. For each aspiration hole a Aspiration reducing Film Sheet with corresponding punch diameter and Marking Tape must be provided.

> **i** **Notice**
> For applications in areas where a blowing-out system is necessary (e. g. low-temperature areas or where high levels of dust accumulate), special suction reducers with plastic clips are available as separate items.

For further information on the following aspects of FAS-420 planning, please refer to the operation guide "FAS-420 Series Aspirating Smoke Detectors LSN improved version" (product ID F.01U.029.275):

- Specifying the sensitivity
- Standard planning in line with VdS
- Planning with long pipe feed lines
- Planning for high-rise warehouses
- Simplified Planning
- Planning with single-hole monitoring
- Planning for forced airflow

Parts Included

Type of device	Qty	Components
FAS-420-TP1	1	Aspirating Smoke Detector basic unit, with LED displays for operation, malfunction, and alarm, for one Detector Module, for connecting one pipe system
FAS-420-TP1-SL	1	Silent version of FAS-420-TP1
FAS-420-TP2	1	Aspirating Smoke Detector basic unit, with LED displays for operation, malfunction, and alarm, for two Detector Modules, for connecting two pipe systems
FAS-420-TP2-SL	1	Silent version of FAS-420-TP2
FAS-420-TT1	1	Aspirating Smoke Detector basic unit, with differentiated alarm and smoke level display, for one Detector Module, for connecting one pipe system
FAS-420-TT1-SL	1	Silent version of FAS-420-TT1
FAS-420-TT2	1	Aspirating Smoke Detector basic unit, with differentiated alarm and smoke level display, for two Detector Modules, for connecting two pipe systems
FAS-420-TT2-SL	1	Silent version of FAS-420-TT2

> **i** **Notice**
> One or two Detector Modules must be ordered separately for the basic units (see table). Only use Detector Modules of the type DM-TT-XX for all variants of the FAS-420 series.

For type of device	Qty	Required Detector Modules
FAS-420-TP1 FAS-420-TP1-SL	1	Either DM-TT-50(80), DM-TT-10(25) or DM-TT-01(05)
FAS-420-TP2 FAS-420-TP2-SL	2	DM-TT-50(80), DM-TT-10(25) and/or DM-TT-01(05)
FAS-420-TT1 FAS-420-TT1-SL	1	Either DM-TT-50(80), DM-TT-10(25) or DM-TT-01(05)
FAS-420-TT2 FAS-420-TT2-SL	2	DM-TT-50(80), DM-TT-10(25) and/or DM-TT-01(05)

Technical Specifications

Electrical

Operating voltage	15 V DC to 33 V DC	
Current consumption from LSN	6.25 mA	
Current consumption from auxiliary power supply (at 24 V)	FAS-420-TP1/ FAS-420-TT1	FAS-420-TP2/ FAS-420-TT2
• Starting current, fan voltage 6.9 V	300 mA	330 mA
• Starting current, fan voltage 9 V	300 mA	330 mA
• In standby, fan voltage 6.9 V	200 mA	230 mA
• In standby, fan voltage 9 V	260 mA	310 mA
• On alarm, fan voltage 6.9 V	230 mA	290 mA
• On alarm, fan voltage 9 V	290 mA	370 mA

Mechanics

Displays on the device	
FAS-420-TP1 / -TP2 and -SL	
• In operation	Green LED
• Malfunction	Yellow LED
• Alarm	1 red LED / 2 red LEDs
FAS-420-TT1 / -TT2 and -SL	

• In operation	Green LED	
• Malfunction	Yellow LED	
• Level display	1 x / 2 x smoke level display, each with 10 segments (1 - 10)	
• Alarm	1 x 3 / 2 x 3 red LEDs for info alarm, pre-alarm and main alarm	

Conical duct connections for Ø 25 mm	
• Aspiration pipe	1 pipe / 2 pipes
• Air return	1 pipe
Cable bushings	5 x M 20 and 2 x M 25
Dimensions (W x H x D)	200 x 292 x 113 mm
Housing material	Plastic (ABS)
Housing color	Papyrus white, RAL 9018
Weight	Approx. 1.5 kg

Environmental conditions

Protection class as per EN 60529	IP 20
Permissible temperature range	
• Series FAS-420 Aspirating Smoke Detectors	-20 °C to +60 °C
• Pipe system PVC	00 °C to +60 °C
• Pipe system ABS	-40 °C to +80 °C
Permissible relative humidity (non-condensing)	10 to 95 %

Special features

Acoustic power level	
• FAS-420-TP1 FAS-420-TP2 FAS-420-TT1 FAS-420-TT2	45 dB(A)
• FAS-420-TP1-SL FAS-420-TP2-SL FAS-420-TT1-SL FAS-420-TT2-SL	38 dB(A)
Response sensitivity (max. light obscuration)	
• Detector Module DM-TT-50(80)	0.5 %/m (0.8 %/m)
• Detector Module DM-TT-10(25)	0.1 %/m (0.25 %/m)
• Detector Module DM-TT-01(05)	0.015 %/m (0.05 %/m)
Service life of the fan (12 V)	43,000 hrs at 24 °C

DM-TT-01(05) Detector Module
for Aspirating Smoke Detectors Series FAS-420, with
max. sensitivity of 0,015 %/m (0.05 %/m) light
obscuration
Order number **DM-TT-01(05)**

MT-1 Device Mounting
Order number **TITANUS MT-1 mount**

FAS-ASD-DIAG Diagnostic Software
The FAS-ASD-DIAG Diagnostic Software enables
reading out all stored device data and gives advices to
remove failures.
Including connection cable for USB interface and
diagnosis tool with an infrared interface.
Order number **FAS-ASD-DIAG**

Test Pipe
Order number **RAS test pipe**

Test Adapter
Order number **RAS test adapter**

**AF-BR Marking Tapes for Aspiration Reducing Film
Sheets**
Price per piece, DU 10 pieces
Order number **TITANUS AF-BR**

AF-2.0 Aspiration Reducing Film Sheets 2.0 mm
Price per piece, DU 10 pieces
Order number **TITANUSAF-2.0**

AF-2.5 Aspiration Reducing Film Sheets 2.5 mm
Price per piece, DU 10 pieces
Order number **TITANUSAF-2.5**

AF-3.0 Aspiration Reducing Film Sheets, 3.0 mm
Price per piece, DU 10 pieces
Order number **TITANUSAF-3.0**

AF-3.2 Aspiration Reducing Film Sheets, 3.2 mm
Price per piece, DU 10 pieces
Order number **TITANUSAF-3.2**

AF-3.4 Aspiration Reducing Film Sheets, 3.4 mm
Price per piece, DU 10 pieces
Order number **TITANUSAF-3.4**

AF-3.6 Aspiration Reducing Film Sheets, 3.6 mm
Price per piece, DU 10 pieces
Order number **TITANUS AF-3.6**

AF-3.8 Aspiration Reducing Film Sheets, 3.8 mm
Price per piece, DU 10 pieces
Order number **TITANUSAF-3.8**

AF-4.0 Aspiration Reducing Film Sheets, 4.0 mm
Price per piece, DU 10 pieces
Order number **TITANUSAF-4.0**

AF-4.2 Aspiration Reducing Film Sheets, 4.2 mm
Price per piece, DU 10 pieces
Order number **TITANUSAF-4.2**

AF-4.4 Aspiration Reducing Film Sheets, 4.4 mm
Price per piece, DU 10 pieces
Order number **TITANUSAF-4.4**

AF-4.6 Aspiration Reducing Film Sheets, 4.6 mm
Price per piece, DU 10 pieces
Order number **TITANUSAF-4.6**

AF-5.0 Aspiration Reducing Film Sheets, 5.0 mm
Price per piece, DU 10 pieces
Order number **TITANUSAF-5.0**

AF-5.2 Aspiration Reducing Film Sheets, 5.2 mm
Price per piece, DU 10 pieces
Order number **TITANUSAF-5.2**

AF-5.6 Aspiration Reducing Film Sheets, 5.6 mm
Price per piece, DU 10 pieces
Order number **TITANUSAF-5.6**

AF-6.0 Aspiration Reducing Film Sheets, 6.0 mm
Price per piece, DU 10 pieces
Order number **TITANUSAF-6.0**

AF-6.8 Aspiration Reducing Film Sheets, 6.8 mm
Price per piece, DU 10 pieces
Order number **TITANUSAF-6.8**

AF-7.0 Aspiration Reducing Film Sheets, 7.0 mm
Price per piece, DU 10 pieces
Order number **TITANUSAF-7.0**

FAS-420 Series Aspirating Smoke Detectors LSN improved version

	FAS-420-TP1 Aspirating Smoke Detector LSN improved version	FAS-420-TP2 Aspirating Smoke Detector LSN improved version	FAS-420-TT1 Aspirating Smoke Detector LSN improved version	FAS-420-TT2 Aspirating Smoke Detector LSN improved version
Model variant	with simple alarm indication (only main alarm)	with simple alarm indication (only main alarm)	with differentiated alarm indication (info, pre, and main alarm) and smoke level display	with differentiated alarm indication (info, pre, and main alarm) and smoke level display
Operating voltage	15 V DC . . . 33 V DC	15 V DC . . . 33 V DC	15 V DC . . . 33 V DC	15 V DC . . . 33 V DC
Current consumption LSN	6.25 mA	6.25 mA	6.25 mA	6.25 mA
Current consumption AUX	depending on the configuration between 200 mA and 300 mA	depending on the configuration between 230 mA and 370 mA	depending on the configuration between 200 mA and 300 mA	depending on the configuration between 230 mA and 370 mA
Protection category	IP 20	IP 20	IP 20	IP 20
Permissible operating temperature				
- Aspirating smoke detectors	-20 °C . . . +60 °C	-20 °C . . . +60 °C	-20 °C . . . +60 °C	-20 °C . . . +60 °C
- Pipe system PVC	0 °C . . . +60 °C	0 °C . . . +60 °C	0 °C . . . +60 °C	0 °C . . . +60 °C
- Pipe sytem ABS	-40 °C . . . +80 °C	-40 °C . . . +80 °C	-40 °C . . . +80 °C	-40 °C . . . +80 °C
Number of detector modules	1	2	1	2
Dual-detector dependency configurable	–	●	–	●
Max. sensitivity (light obscuration)				
- max. response sensitivity	depending on the detector module between 0.05%/m and 0.8%/m	depending on the detector module between 0.05%/m and 0.8%/m	depending on the detector module between 0.05%/m and 0.8%/m	depending on the detector module between 0.05%/m and 0.8%/m
- max. display sensitivity	–	–	depending on the detector module between 0.005%/m and 0.08%/m	depending on the detector module between 0.005%/m and 0.08%/m
Max. number of air sampling openings per pipe system	32	2x32	32	2x32
Max. monitoring area	2880 m²	2x2880 m²	2880 m²	2x2880 m²
Max. length of the pipe system	300 m	2x280 m	300 m	2x280 m