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# FAP-420/FAH-420 Automatic Fire Detectors LSN improved version



- ▶ Combination of optical, thermal and chemical sensors with intelligent evaluation electronics.
- ▶ Earliest detection of lightest smoke (TF1) with the double-optical smoke detectors with Dual-Ray technology
- ▶ Detector properties adapted to cater for room usage
- ▶ Drift compensation in optical and gas measurement section
- ▶ Maintains LSN loop functions in the event of wire interruption or short-circuit thanks to two integrated isolators
- ▶ Extended system parameters of improved LSN technology

The 420 Series Automatic Fire Detectors offer a superb accuracy as well as detection speed and precision.

The versions with dual-optical sensor (DO-detectors: FAP-DO420, FAP-DOT420, FAP-DOTC420) are able to detect lightest smoke (TF1).

These detectors provide all advantages of LSN improved version. The addressing of the detectors can be configured with the integrated turning switches.

## System Overview

Operating mode	Detector type		
	FAP-DOTC420	FAP-DOT420	FAP-DO420
Combined	x	x	-
Optical	x	x	x
Dual-Optical	x	x	x
Thermo-max.	x	x	-
Thermal differential	x	x	-
Chemical (+ optical)	x	-	-

Operating mode	Detector type			
	FAP-OTC 420	FAP-OT 420	FAP-O 420 (KKW)	FAH-T 420 (KKW)
Combined	x	x	-	-
Optical	x	x	x	-
Dual-Optical	-	-	-	-
Thermo-max.	x	x	-	x
Thermal differential	x	x	-	x
Chemical (+ optical)	x	-	-	-

## Functions

### Sensor technology and signal processing

The individual sensors can be configured via the LSN network manually or using a timer.

All sensor signals are analyzed continually by the internal evaluation electronics (Intelligent Signal Processing – ISP) and are linked with each other via an inbuilt microprocessor. The link between the sensors means that the combined detectors can also be used where light smoke, steam or dust must be expected during the course of normal operation.

Only if the signal combination corresponds to that for the programming of the selected usage site field code will the alarm be triggered automatically. This results in a higher level of security against false alarms.

In addition, the time curve for fire and malfunction detection sensor signals is also analyzed, resulting in increased reliability of detection for each individual sensor.

In the case of the optical and chemical sensor, the response threshold (drift compensation) is actively adjusted. Manual or time-controlled switch-off of individual sensors is required for adjustment to extreme interference factors.

### **Optical sensor (smoke sensor)**

The optical sensor uses the scattered-light method.

An LED transmits light to the measuring chamber, where it is absorbed by the labyrinth structure. In the event of a fire, smoke enters the measuring chamber and the smoke particles scatter the light from the LED. The amount of light hitting the photo diode is converted into a proportional electrical signal.

The DO-Detectors use two optical sensors with different wavelength. The Dual Ray Technology works with a infrared and a blue LED, so that light smoke can be detected reliably (TF1 detection).

### **Thermal sensor (temperature sensor)**

A thermistor in a resistance network is used as a thermal sensor, from which an analog-digital converter measures the temperature-dependent voltage at regular intervals.

Depending on the specified detector class, the temperature sensor triggers the alarm status when the maximum temperature of 54 °C or 69 °C is exceeded (thermal maximum), or if the temperature rises by a defined amount within a specified time (thermal differential).

### **Chemical sensor (CO gas sensor)**

The main function of the gas sensor is to detect carbon monoxide (CO) generated as a result of a fire, but it will also detect hydrogen (H) and nitrous monoxide (NO). The sensor signal value is proportional to the concentration of gas. The gas sensor delivers additional information to effectively suppress deceptive values.

Depending on the service life of the gas sensor, the FAP-DOTC420 detector switches off the C sensor after six years of operation. The FAP-OTC 420 detector switches off the C sensors after five years of operation. The detector FAP-DOTC420 will continue function as DOT detector. The FAP-OTC 420 detector will continue to function as an OT detector. The detectors should then be exchanged immediately in order to be able to keep using the higher reliability of detection of the DOTC/OTC detector.

### **Improved LSN features**

The 420 Series Fire Detectors offer all the features of the improved LSN technology:

- Flexible network structures, including "T-tapping" without additional elements
- Up to 254 LSN improved elements per loop or stub line
- Automatic or manual detector addressing selectable via rotary switch, in each case with or without auto-detection
- Power supply for connected elements via LSN bus
- Unscreened fire detection cable can be used
- Cable length up to 3000 m (with LSN 1500 A)
- Downwards compatibility to existing LSN systems and central units

### **LSN features**

#### **Operating data display**

In addition, the FAP/FAH-420 detectors offer all the established benefits of LSN technology. WinPara (except DO detectors) or RPS software can be used to change the detection characteristics of the respective room utilization. In addition, each configured detector, with the exception of the KKW and DO types, can provide the following data:

- Serial number,
- Contamination level of the optical section,
- Operating hours,
- Current analog values.

Analog values are (except DO detectors):

- Optical system values: current measured value of the scattered light sensor; the measuring range is linear and covers from 170 (new) to 700 (dirty).
- Contamination: the contamination value shows how much the current contamination value has increased relative to the original condition.
- CO value: display of the current measured value (max. 550).

#### **Self-monitoring of sensor technology**

The sensor is self-monitoring. The following errors are indicated on the fire panel:

- Fault indication in the event of the failure of the detector electronics
- Continuous display of contamination level during service
- Fault indication if heavy contamination is detected (in place of false alarms)

In the event of wire interruption or short-circuit, integrated dividing elements maintain the functional security of the LSN loop.

In the event of an alarm, individual detector identification is transmitted to the fire panel.

#### Further performance characteristics

The detector alarm indication takes the form of a red flashing LED that is easily visible 360°.

It is possible to activate a remote external detector alarm display. The detector base no longer has to be directed due to the centralized position of the individual display.

The integrated strain relief for interfloor cables prevents the removal of cables from the terminal after installation. The terminals for cable cross-sections up to 2.5 mm<sup>2</sup> are very easily accessible.

The detector bases have a mechanical removal lock (can be activated/deactivated).

The detectors have a dust-repellent labyrinth and cap construction.

#### Certifications and Approvals

The detectors comply with:

- EN 54-7: 2000/A2 (2006)
- EN 54-5: 03/2001 only detectors with thermal sensor
- EN 54-17:2005
- prEN 54-29: 2008 only FAP-DOT420, FAP-DOTC420
- CEA 4021:07:2003

Region	Certification
Germany	VdS
	G 205080 FAP-OTC 420
	G 205081 FAP-OT 420
	G 205082 FAP-O 420
	G 205083 FAH-T 420
	G 205088 FAP-O 420 KKW
	G 205089 FAH-T 420 KKW
	G 210056 FAP-DO420
	G 210057 FAP-DOT420
	G 210055 FAP-DOTC420

Region	Certification		
Europe	CE	FAP-/FAH-420 / FAA-MSR420 / FAA-MS-R-SP	
		FAP- / FAH-420 KKW	
		FAP-DO420/FAP-DOT420/FAP-DOTC420	
	CPD	0786-CPD-20129	FAH-T 420
		0786-CPD-20128	FAH-T 420 KKW
		0786-CPD-20117	FAP-O 420
		0786-CPD-20125	FAP-O 420 KKW
		0786-CPD-20118	FAP-OT 420
		0786-CPD-20119	FAP-OT 420
		0786-CPD-20120	FAP-OTC 420
		0786-CPD-20121	FAP-OTC 420
		0786-CPD-20975	FAP-DO420
		0786-CPD-20974	FAP-DOT420
		0786-CPD-20973	FAP-DOTC420
Poland	CNBOP	2568/2007	FAH-T420
		2567/2007	FAP-O420
		2587/2007	FAP-OT420
		2588/2007	FAP-OTC420
		Hungary	TMT
TMT-17/2006	FAP-O 420, FAP-O 420 KKW		
TMT-18/2006	FAH-T 420, FAH-T 420 KKW		

#### Installation/Configuration Notes

- You can use the DO detectors only with the Panel Controller MPC-xxxx-B or the FPA-1200. The Panel Controller MPC-xxxx-A cannot be used.
- For connection to the fire panels FPA-5000 and FPA-1200 with the improved LSN system parameters in "Classic Mode" can be connected to the LSN fire panels BZ 500 LSN, UEZ 2000 LSN, UGM 2020 and to other panels or their receiver modules with identical connection conditions, although with the previous LSN system parameters (except DO detectors)
- During planning works, it is essential to adhere to national standards and guidelines.

#### Installation/configuration notes in accordance with VdS/VDE

- The FAP-DOTC420, FAP-DOT420, FAP-OTC 420, and FAP-OT 420 types are planned in accordance with the guidelines for optical detectors if operated as optical detectors or as combined optical/thermal detectors (see DIN VDE 0833 Part 2 and VDS 2095)
- If occasional disconnection of the optical unit (scattered light sensor) is required, planning must be based on the guidelines for heat detectors (see DIN VDE 0833 Part 2 and VDS 2095)

- When planning fire barriers according to DIBt, note that the FAH-T 420 (KKW) must be configured in accordance with class A1R.

## Parts Included

Detector type	Qty.	Components
FAP-DOTC420	1	Multisensor Detector Dual-Optical, Thermal, Chemical
FAP-OTC 420	1	Multisensor Detector Optical/Thermal/Chemical
FAP-DOT420	1	Multisensor Detector Dual-Optical, Thermal
FAP-OT 420	1	Multisensor Detector Optical/Thermal
FAP-DO420	1	Dual-Optical Smoke-Detector
FAP-O 420	1	Optical Smoke Detector
FAH-T 420	1	Heat Detector (Thermal Differential/Thermal Maximum)
FAP-O 420 KKW	1	Optical Smoke Detector *
FAH-T 420 KKW	1	Heat Detector (Thermal Differential/Thermal Maximum) *

\* For use in areas with increased radioactive radiation

## Technical Specifications

### Electrical

Operating voltage	15 V DC to 33 V DC
• Current consumption	< 0.55 mA
Alarm output	Per data word by two-wire signal line
Indicator output	Open collector connects 0 V over 1.5 kΩ through, max. 15 mA

### Mechanics

Dimensions	
• Without base	Ø 99.5 x 52 mm
• With base	Ø 120 x 63.5 mm
Housing	
• Material	Plastic, ABS (Novodur)
• Color	White, similar to RAL 9010, matt finish
Weight	
• FAP-DOTC 420	Approx. 80 g / Approx. 135 g
• FAP-DOT 420, FAP-DO 420	Approx. 75 g / Approx. 125 g
• FAP-OTC 420	Approx. 80 g / Approx. 125 g
• FAP-OT 420, FAP-O 420, FAP-O 420 KKW, FAH-T 420, FAH-T 420 KKW	Approx. 75 g / Approx. 115 g

### Environmental conditions

Permissible operating temperature

• FAP-DOTC420	-10 °C to +50 °C
• FAP-OTC 420	
• FAP-DOT420	-20 °C to +50 °C
• FAP-OT 420	
• FAH-T 420	
• FAH-T 420 KKW	
• FAP-DO420	-20 °C to +65 °C
• FAP-O 420	
• FAP-O 420 KKW	

Permissible storage temperature

• FAP-DOTC420	-20 °C to +50 °C
• FAP-DOT420	-25 °C to +80 °C
• FAP-DO420	-25 °C to +80 °C

Permissible relative humidity 95% (non-condensing)

Permissible air speed 20 m/s.

Protection class as per EN 60529 IP 40,  
IP 43 detector base with damp room seal

### Further characteristics

Response sensitivity

• Optical part	In accordance with EN 54 T7 (programmable)
• Thermal maximum part	> 54 °C / >69 °C
• FAP-DO420-series thermal differential part	A2S / A2R / BS / BR, in line with EN 54-5 (programmable)
• FAP-O420-series thermal differential part	A1R / A2R / BR, in line with EN 54-5 (programmable)
• Gas sensor	In ppm range

Individual display LED red

Color code

• FAP-DOTC420	2 yellow concentric loops
• FAP-OTC 420	Yellow loop
• FAP-DOT 420	2 black concentric loops
• FAP-OT 420	Black loop
• FAP-DO420	2 gray concentric loops
• FAP-O 420, FAP-O 420 KKW	No marking
• FAH-T 420, FAH-T 420 KKW	Red loop

## Planning

### Monitoring area

<ul style="list-style-type: none"> <li>FAP-DOTC 420, FAP-DOT 420, FAP-DO 420, FAP-OTC 420, FAP-OT 420, FAP-O 420</li> </ul>	Max. 120 m <sup>2</sup> (Heed local guidelines!)
<ul style="list-style-type: none"> <li>FAH-T 420 FAH-T 420 KKW</li> </ul>	Max. 40 m <sup>2</sup> (Heed local guidelines!)
Maximum installation height	16 m (Heed local guidelines!)
<ul style="list-style-type: none"> <li>FAP-DOTC 420, FAP-DOT 420, FAP-DO 420, FAP-OTC 420, FAP-OT 420, FAP-O 420, FAP-O 420 KKW</li> </ul>	Max. 16 m (Heed local guidelines!)
<ul style="list-style-type: none"> <li>FAH-T 420, FAH-T 420 KKW</li> </ul>	Max. 7.5 m (Heed local guidelines!)

## Ordering Information

<b>FAP-OTC 420 Multisensor Detector Optical/Thermal/Chemical</b> for LSN improved version	<b>FAP-OTC 420</b>
<b>FAP-OT 420 Multisensor Detector Optical/Thermal</b> for LSN improved version	<b>FAP-OT 420</b>
<b>FAP-O 420 Optical Smoke Detector</b> for LSN improved version	<b>FAP-O 420</b>
<b>FAH-T 420 Heat Detector</b> thermal differential/thermal maximum, for LSN improved version	<b>FAH-T 420</b>
<b>FAP-O 420 KKW Optical Smoke Detector</b> for use in areas with increased radioactive radiation, for LSN improved version	<b>FAP-O420-KKW</b>
<b>FAH-T 420 KKW Heat Detector</b> thermal differential/thermal maximum, for use in areas with increased radioactive radiation, for LSN improved version	<b>FAH-T420-KKW</b>
<b>FAP-DO420 Dual-Optical Smoke Detector</b> for LSN improved version	<b>FAP-DO420</b>
<b>FAP-DOT420 Multisensor Detector Dual-Optical, Thermal</b> for LSN improved version	<b>FAP-DOT420</b>
<b>FAP-DOTC420 Multisensor Detector Dual-Optical, Thermal, Chemical</b> For LSN improved version	<b>FAP-DOTC420</b>

## Ordering Information

### Accessories

<b>MS 400 Detector Base</b> for surface-mounted and flush-mounted cable feed	<b>MS 400</b>
<b>MSF 400 Detector Base with Damp Room Seal</b> for surface-mounted and flush-mounted cable feed	<b>MSF 400</b>
<b>MSC 420 Additional Base with Damp Room Seal</b> for surface-mounted cable feed	<b>MSC 420</b>
<b>FAA-MSR 420 Detector Base with Relay</b> is a detector base with a change-over relay (Form C)	<b>FAA-MSR 420</b>
<b>FAA-MS 420-R-SP Detector Base with Relay and Spring</b> for use in Great Britain	<b>FAA-MS 420-R-SP</b>
<b>MS 420 LSN Detector Base with Spring</b> for use in Great Britain	<b>MS 420</b>
<b>FNM-420-A-BS-WH Base Sounder Indoor, white</b> for signaling an alarm directly at the fire location, can be employed either as base sounders or stand-alone sounders, for LSN improved technology	<b>FNM-420-A-BS-WH</b>
<b>MSS 401 LSN Detector Base Sounder White</b> for direct connection to the LSN with direct separate power supply	<b>MSS 401</b>
<b>SSK 400 Protective Dust Cover</b> (packing unit = 10 units)	<b>SSK 400</b>
<b>TP4 400 Support Plate for Detector Identification</b> (packing unit = 50 units)	<b>TP4 400</b>
<b>TP8 400 Support Plate for Detector Identification</b> (packing unit = 50 units)	<b>TP8 400</b>
<b>SK 400 Protective Basket</b> prevents damage	<b>SK 400</b>
<b>MH 400 Detector Heating Element</b> usable at locations where the functional safety of the detector might be impaired by condensation	<b>MH 400</b>
<b>MK 400 Detector Console</b> Console for DIBt compliant mounting of detectors above doors etc., including detector base	<b>MK 400</b>
<b>Mounting Bracket for Fire Detectors on False Floor Stilts</b>	<b>FMX-DET-MB</b>
<b>MPA External Detector Alarm Display according to DIN 14623</b> the transparent red alarm display conforms to DIN 14623	<b>MPA</b>

### Ordering Information

**FAA-420-RI Remote Indicator**

required if the detector is not directly visible  
or has been mounted in false ceilings or false  
floors

**FAA-420-RI**

**FAP-DOTC420****FAP-DOT420****FAP-DO420****FAP-OTC 420****FAP-OT 420**

<b>Detector type</b>	Dual-optical/thermal/chemical	Dual-optical/thermal	Dual-optical	optical/thermal/chemical	optical/thermal
<b>Operating voltage</b>	15 V DC ... 33 V DC	15 V DC ... 33 V DC	15 V DC ... 33 V DC	15 V DC ... 33 V DC	15 V DC ... 33 V DC
<b>Current consumption</b>	< 0.55 mA	< 0.55 mA	< 0.55 mA	< 0.55 mA	< 0.55 mA
<b>Protection category</b>	IP 40, IP 43 with MSF 400	IP 40, IP 43 with MSF 400	IP 40, IP 43 with MSF 400	IP 40, IP 43 with MSF 400	IP 40, IP 43 with MSF 400
<b>Permissible operating temperature</b>	-10 °C ... +50 °C	-20 °C ... +50 °C	-20 °C ... +65 °C	-10 °C ... +50 °C	-20 °C ... +50 °C
<b>Monitoring area</b>	max. 120 m <sup>2</sup>	max. 120 m <sup>2</sup>	max. 120 m <sup>2</sup>	max. 120 m <sup>2</sup>	max. 120 m <sup>2</sup>
<b>Maximum installation height</b>	16 m	16 m	16 m	16 m	16 m
<b>Use in areas with increased radioactive radiation</b>	–	–	–	–	–
<b>Color code</b>	2 yellow loops	2 black loops	2 gray loops	yellow loop	black loop

**FAP-O 420****FAH-T 420****FAP-O420-KKW****FAH-T420-KKW**

<b>Detector type</b>	optical	thermal differential/thermal maximum	optical	thermal differential/thermal maximum
<b>Operating voltage</b>	15 V DC ... 33 V DC	15 V DC ... 33 V DC	15 V DC ... 33 V DC	15 V DC ... 33 V DC
<b>Current consumption</b>	< 0.55 mA	< 0.55 mA	< 0.55 mA	< 0.55 mA
<b>Protection category</b>	IP 40, IP 43 with MSF 400	IP 40, IP 43 with MSF 400	IP 40, IP 43 with MSF 400	IP 40, IP 43 with MSF 400
<b>Permissible operating temperature</b>	-20 °C ... +65 °C	-20 °C ... +50 °C	-20 °C ... +65 °C	-20 °C ... +50 °C
<b>Monitoring area</b>	max. 120 m <sup>2</sup>	max. 40 m <sup>2</sup>	max. 120 m <sup>2</sup>	max. 40 m <sup>2</sup>
<b>Maximum installation height</b>	16 m	7.5 m	16 m	7.5 m
<b>Use in areas with increased radioactive radiation</b>	–	–	•	•
<b>Color code</b>	no marking	red loop	no marking	red loop

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