

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

www.boschsecurity.com



BOSCH
Invented for life



- ▶ Combination of optical, thermal and chemical sensors with intelligent evaluation electronics.
- ▶ Earliest detection of lightest smoke (TF1 & TF9) with the double-optical smoke detectors featuring 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

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 and TF9).

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 I | x | x | - | x |
| Chemical (+ optical) | x | - | - | - |

Functions

Sensor technology and signal processing

The individual sensors can be configured manually or timer-based via the LSN network.

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 of the sensor signals on fire and fault detection is analyzed, resulting in an increased detection reliability 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 an infrared and a blue LED, so that light smoke can be detected reliably (TF1 and TF9 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.

Since the service life of the gas sensor is limited, the C sensor of the FAP-DOTC420 detector shuts down automatically after 6 years of operation, and the C sensor of the FAP-OTC 420 detector after 5 years of operation. The FAP-DOTC420 detector will then still operate as a DOT detector and the FAP-OTC 420 detector as an OT detector. The detectors should be exchanged immediately in order to keep the higher detection reliability of the DOTC/OTC versions.

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. The RPS programming 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, can provide the following data:

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

Analog values:

- 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 mm² 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 |
|---------|---|
| | 000017/01 FAP-O420 |
| Germany | VdS G 205080 FAP-OTC 420_G205080 |
| | VdS G 205081 FAP-OT 420_G205081 |
| | VdS G 205082 FAP-O 420_G205082 |
| | VdS G 205083 FAH-T 420_G205083 |
| | VdS G 205088 FAP-O 420 KKW_G205088 |
| | VdS G 205089 FAH-T 420 KKW_G205089 |
| | VdS G 210055 FAP-DOTC420 |
| | VdS G 210056 FAP-DO420 |
| | VdS G 210057 FAP-DOT420 |
| Europe | CE FAP-O420/FAP-OT420/FAP-OTC420/FAH-T420 |
| | CE FAP-DO420/FAP-DOT420/FAP-DOTC420 |
| | CE FAP-/FAH-420 KKW |
| | CE FAP-/FAH-420/FAA-MSR420/FAA-MS-R-SP |
| | CPD 0786-CPD-20117 FAP-O 420 |
| | CPD 0786-CPD-20118 FAP-OT 420 |
| | CPD 0786-CPD-20119 FAP-OT 420 |
| | CPD 0786-CPD-20120 FAP-OTC 420 |

| Region | Certification |
|---------|---|
| | CPD 0786-CPD-20121 FAP-OTC 420 |
| | CPD 0786-CPD-20125 FAP-O 420 KKW |
| | CPD 0786-CPD-20126 FAP-OT 420 KKW |
| | CPD 0786-CPD-20127 FAP-OT 420 KKW |
| | CPD 0786-CPD-20128 FAH-T 420 KKW |
| | CPD 0786-CPD-20129 FAH-T 420 |
| | CPD 0786-CPD-20973 FAP-DOTC420 |
| | CPD 0786-CPD-20974 FAP-DOT420 |
| | CPD 0786-CPD-20975 FAP-DO420 |
| Poland | CNBOP 2567/2007 FAP-O420 |
| | CNBOP 2568/2007 FAH-T420 |
| | CNBOP 2587/2007 FAP-OT420 |
| | CNBOP 2588/2007 FAP-OTC420 |
| Hungary | TMT TMT-17/2006 FAP-O 420, FAP-O 420 KKW |
| | TMT TMT-18/2006 FAH-T 420, FAH-T 420 KKW |
| | TMT TMT-19/2006 FAP-OT 420, FAP-OT 420 KKW, FAP-OTC 420 |
| Ukraine | MOE UA1.016.0070213-11 FAP-OTC420 |
| | MOE UA1.016-0070210-11 FAP-OT420 |
| | MOE UA1.016-0070215-11 FAP-DO420 |
| | MOE UA1.016-0070218-11 FAP-DOT |
| | MOE UA1.016-0070221-11 FAP-DOTC |
| | MOE UA1.016-0091995-09 FAP-O420_MS400_MSF400_FAA-420-RI |
| | MOE UA1.016-0091997-09 FAH-T420_MS400_MSF400 |

Installation/configuration notes

- Connectable to the fire panels FPA-5000 and FPA-1200 with the improved LSN system parameters
- You can use the DO detectors only with the Panel Controller MPC version B and higher. The Panel Controller MPC-xxxx-A cannot be used.
- In "Classic Mode" connectable 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
- During planning works, it is essential to adhere to national standards and guidelines.
- The detector can be painted (cap and base) and thereby adapted to the surrounding colour scheme. Note the information in the Painting Instructions (Document Number F.01U.089.231).

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 | Without / With packaging |
| • 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 • FAP-OTC 420 | -10 °C to +50 °C |
| • FAP-DOT420 • FAP-OT 420 • FAH-T 420 • FAH-T 420 KKW | -20 °C to +50 °C |
| • FAP-DO420 • FAP-O 420 • FAP-O 420 KKW | -20 °C to +65 °C |
| 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 |
| • Thermal differential part: FAH-T 420, FAH-T 420 KKW | A2S / A2R / A1 / A1R / BS / BR, in line with EN 54-5 (programmable) |
| • Thermal differential part: FAP-DOTC420, FAP-DOT420, FAP-OTC420, FAP-OT420 | A2S / A2R / BS / 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 | |
| • FAP-DOTC 420, FAP-DOT 420, FAP-DO 420, FAP-OTC 420, FAP-OT 420, FAP-O 420 | Max. 120 m ² (Heed local guidelines!) |
| • FAH-T 420 FAH-T 420 KKW | Max. 40 m ² (Heed local guidelines!) |
| Maximum installation height | 16 m (Heed local guidelines!) |
| • FAP-DOTC 420, FAP-DOT 420, FAP-DO 420, FAP-OTC 420, FAP-OT 420, FAP-O 420, FAP-O 420 KKW | Max. 16 m (Heed local guidelines!) |
| • FAH-T 420, FAH-T 420 KKW | Max. 7.5 m (Heed local guidelines!) |

Ordering information

FAP-OTC 420 Multisensor Detector Optical/Thermal/Chemical

for LSN improved version
Order number **FAP-OTC 420**

FAP-OT 420 Multisensor Detector Optical/Thermal

for LSN improved version
Order number **FAP-OT 420**

FAP-O 420 Optical Smoke Detector

for LSN improved version
Order number **FAP-O 420**

FAH-T 420 Heat Detector

thermal differential/thermal maximum, for LSN improved version
Order number **FAH-T 420**

FAP-O 420 KKW Optical Smoke Detector

for use in areas with increased radioactive radiation, for LSN improved version
Order number **FAP-O420-KKW**

FAH-T420 KKW Heat Detector

thermal differential/thermal maximum, for use in areas with increased radioactive radiation, for LSN improved version
Order number **FAH-T420-KKW**

FAP-DO420 Dual-Optical Smoke Detector

for LSN improved version
Order number **FAP-DO420**

FAP-DOT420 Multisensor Detector Dual-Optical, Thermal

for LSN improved version
Order number **FAP-DOT420**

FAP-DOTC420 Multisensor Detector Dual-Optical, Thermal, Chemical

For LSN improved version
Order number **FAP-DOTC420**

Accessories

MS 400 Detector Base

Order number **MS 400**

MSF 400 Detector Base with Damp Room Seal

for surface-mounted and flush-mounted cable feed
Order number **MSF 400**

MSC 420 Additional Base with Damp Room Seal

for surface-mounted cable feed
Order number **MSC 420**

FAA-MSR 420 Detector Base with Relay

with a change-over relay (Form C)
Order number **FAA-MSR 420**

FAA-MS 420-R-SP Detector Base with Relay and Spring

for use in Great Britain
Order number **FAA-MS 420-R-SP**

MS 420 LSN Detector Base with Spring

With integrated jumper elements that preserve the loop function if the detector is removed
Order number **MS 420**

FNM-420-A-BS-WH Base Sounder Indoor, white

for signaling an alarm directly at the fire location, can be employed either as base sounders or stand-alone sounders, for LSN improved technology
Order number **FNM-420-A-BS-WH**

MSS 401 LSN Detector Base Sounder White

for direct connection to the LSN with direct separate power supply
Order number **MSS 401**

SSK 400 Protective Dust Cover

(packing unit = 10 units)

Order number **SSK 400**

TP4 400 Support Plate for Detector Identification

(packing unit = 50 units)

Order number **TP4 400**

TP8 400 Support Plate for Detector Identification

(packing unit = 50 units)

Order number **TP8 400**

SK 400 Protective Basket

prevents damage

Order number **SK 400**

MH 400 Detector Heating Element

usable at locations where the functional safety of the detector might be impaired by condensation

Order number **MH 400**

MK 400 Detector Console

Console for DIBt compliant mounting of detectors above doors etc., including detector base

Order number **MK 400**

Mounting Bracket for Fire Detectors on False Floor Stilts

Order number **FMX-DET-MB**

MPA External Detector Alarm Display according to DIN 14623






the transparent red alarm display conforms to DIN 14623





Order number **MPA**

FAA-420-RI Remote Indicator

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

Order number **FAA-420-RI**

| | FAP-DOTC420 Multisensor Detector Dual-Optical, Thermal, Chemical | FAP-DOT420 Multisensor Detector Dual-Optical, Thermal | FAP-DO420 Dual- Optical Smoke Detector | FAP-OTC 420 Multisensor Detector Optical/Thermal/ Chemical | FAP-OT 420 Multisensor Detector Optical/Thermal |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| Detector type | Dual-optical/thermal/ chemical | Dual-optical/thermal | Dual-optical | optical/thermal/ chemical | optical/thermal |
| 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 | 15 V DC ... 33 V DC |
| Current consumption | < 0.55 mA | < 0.55 mA | < 0.55 mA | < 0.55 mA | < 0.55 mA |
| Protection category | 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 |
| Permissible operating temperature | -10 °C ... +50 °C | -20 °C ... +50 °C | -20 °C ... +65 °C | -10 °C ... +50 °C | -20 °C ... +50 °C |
| Monitoring area | max. 120 m ² | max. 120 m ² | max. 120 m ² | max. 120 m ² | max. 120 m ² |
| Maximum installation height | 16 m | 16 m | 16 m | 16 m | 16 m |
| Use in areas with increased radioactive radiation | – | – | – | – | – |
| Color code | 2 yellow loops | 2 black loops | 2 gray loops | yellow loop | black loop |

| | FAP-O 420 Optical Smoke Detector | FAH-T 420 Heat Detector | FAP-O 420 KKW Optical Smoke Detector | FAH-T420 KKW Heat Detector |
|---|---|---|---|---|
| |  |  |  |  |
| Detector type | optical | thermal differential/ thermal maximum | optical | thermal differential/ thermal maximum |
| 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 | < 0.55 mA | < 0.55 mA | < 0.55 mA | < 0.55 mA |
| Protection category | 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 |
| Permissible operating temperature | -20 °C ... +65 °C | -20 °C ... +50 °C | -20 °C ... +65 °C | -20 °C ... +50 °C |
| Monitoring area | max. 120 m ² | max. 40 m ² | max. 120 m ² | max. 40 m ² |
| Maximum installation height | 16 m | 7.5 m | 16 m | 7.5 m |
| Use in areas with increased radioactive radiation | – | – | • | • |
| Color code | no marking | red loop | no marking | red loop |

Represented by:

Americas:

Bosch Security Systems, Inc.
130 Perinton Parkway
Fairport, New York, 14450, USA
Phone: +1 800 289 0096
Fax: +1 585 223 9180
security.sales@us.bosch.com
www.boschsecurity.us

Europe, Middle East, Africa:

Bosch Security Systems B.V.
P.O. Box 80002
5617 BA Eindhoven, The Netherlands
Phone: + 31 40 2577 284
Fax: +31 40 2577 330
emea.securitysystems@bosch.com
www.boschsecurity.com

Asia-Pacific:

Robert Bosch (SEA) Pte Ltd, Security
Systems
11 Bishan Street 21
Singapore 573943
Phone: +65 6571 2808
Fax: +65 6571 2699
apr.securitysystems@bosch.com
www.boschsecurity.asia

China:

Bosch (Shanghai) Security Systems Ltd.
201 Building, No. 333 Fuquan Road
North IBP
Changning District, Shanghai
200335 China
Phone +86 21 22181111
Fax: +86 21 22182398
www.boschsecurity.com.cn

America Latina:

Robert Bosch Ltda Security Systems Division
Via Anhanguera, Km 98
CEP 13065-900
Campinas, Sao Paulo, Brazil
Phone: +55 19 2103 2860
Fax: +55 19 2103 2862
latam.boschsecurity@bosch.com
www.boschsecurity.com