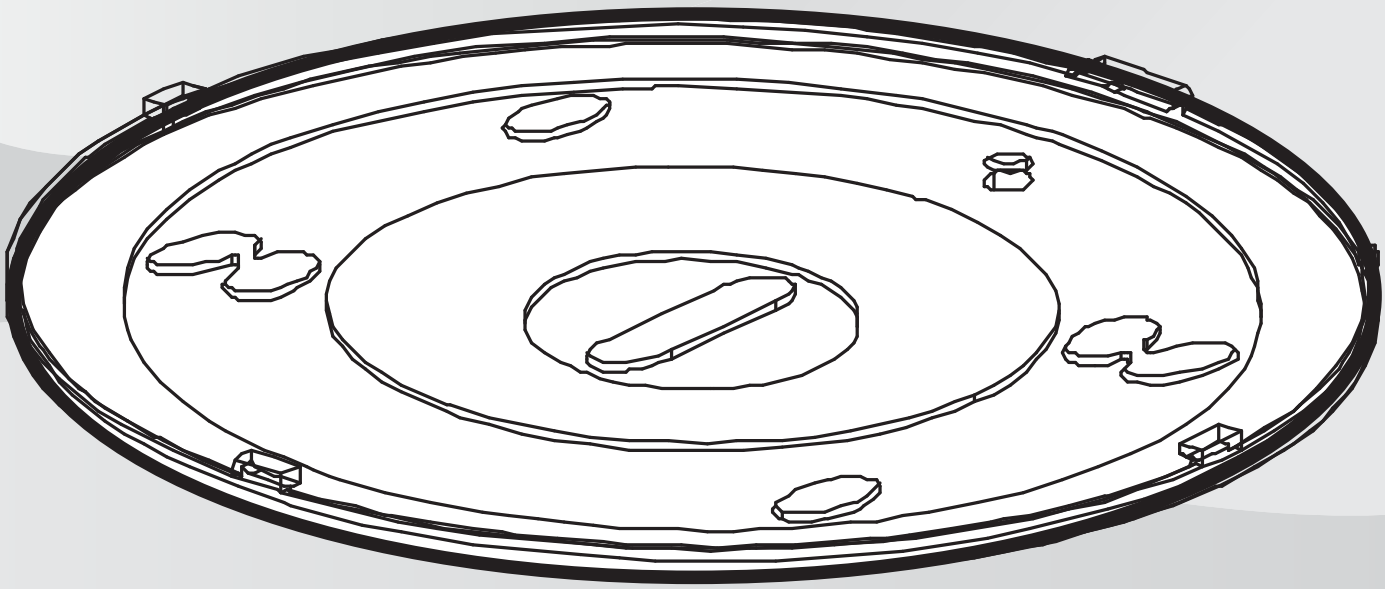
Automatic Detectors LSN improved

FAP-O 520 | FAP-O 520-P | FAP-OC 520 | FAP-OC 520-P



en Operation Guide

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1 Product Description

Figure 1.1: 520 Series Fire Detector

The 520 Series Fire Detectors combine the advantages of the LSN improved technology with the aesthetic benefits of flush-mounted installation and the option to choose the color. The detectors can be connected to any LSNi fire panel. They can also be connected to all classic LSN fire panels.

The detectors with associated trim ring are available in the versions white and transparent with color toning inserts. Through the use of the supplied color toning inserts, optimum adjustment to many different environments becomes possible.

The lack of an optical labyrinth and their easily-cleaned smooth surface means the detectors are also suitable for applications in high-dust areas.

The low profile, flush-mounted design allows the use the detectors even in areas that must be free of protrusions.

Thanks to the geometric arrangement of two separate optical sensor systems, the detectors are not sensitive to interference, such as that caused by insects. The scattered light volume that is evaluated by the sensors is located in the free space a few centimeters below the ceiling.

The contamination level is measured constantly. Contamination of the detector surface leads to an active adjustment of the threshold (drift compensation) and a fault indication at the panel in the case of heavier contamination.

The detector is available as a scattered light fire detector only or as a multisensor detector with an additional gas sensor.

The combination of scattered light detector and gas sensor allows the evaluation of signals with the help of modern signal processing methods. The result is high immunity against deceptive alarms and extended application possibilities in environments that are not suitable for pure scattered light smoke detectors.

The integrated rotary switches allow for an automatic or manual allocation of addresses.

The FAP-520 Detectors can be connected directly to the Local SecurityNetwork LSN.

Accessories

The 520 Series Detectors are generally mounted flush with the ceiling in false ceilings. The detector and base are installed in a robust ceiling mount back box. In addition, a housing for mounting within concrete ceilings can be used.

For special applications where recessed ceiling mounting is not possible, a surface mount back box is available. This is used as an alternative to the ceiling mount back box. The surface mount back box with damp room seal also allows the detector to be used in a humid environment. For special applications, e.g. control of an emergency door in accordance with DIBt, base variants are available with relay. All bases have an integrated strain relief for cables. The connection terminals are easily accessible. Cables up to 3.3 mm^2 in cross section can be used.
An innovative concept for locking the detector module utilizing the push-in/push-out principle allows very quick and easy insertion and exchange of the click and lock detector.
For the detector test and detector exchange, a special user-friendly service accessory is available.

Overview of the 520 Series Detectors and Accessories

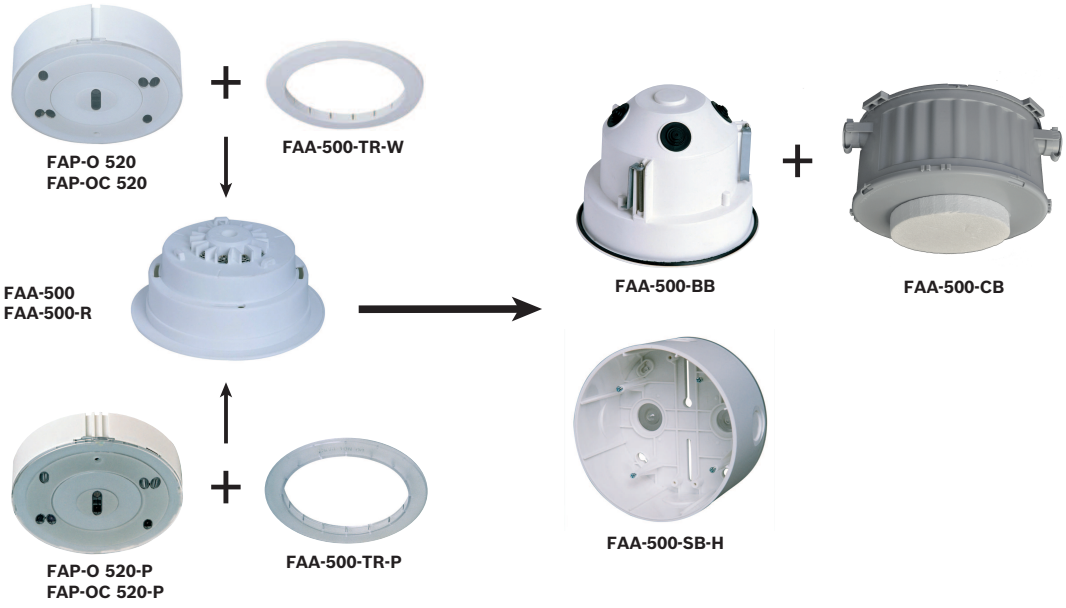


Figure 1.2: 520 Series Detectors and Accessories

Detectors LSN improved:

- FAP-O 520	Optical Fire Detector LSN improved, white
- FAP-O 520-P	Optical Fire Detector LSN improved, transparent with color toning inserts
- FAP-OC 520	Multisensor Fire Detector LSN improved, optical/chemical, white
- FAP-OC 520-P	Multisensor Fire Detector LSN improved, optical/chemical, transparent with color toning inserts
- FAA-500-TR-W	White Trim Ring for detectors 500 and 520 Series
- FAA-500-TR-P	Transparent Trim Ring with color toning inserts for detectors 500 and 520 Series

LSN Detector Bases:

- FAA-500	LSN Detector Base
- FAA-500-R	LSN Detector Base with Relay*

* for connection to the Modular Fire Panel FPA-5000 only

Mounting Boxes:

- FAA-500-BB Ceiling Mount Back Box
- FAA-500-CB Built-in Housing for concrete ceilings
- FAA-500-SB-H Surface Mount Back Box with damp room seal

Service Accessories:

- FAA-500-RTL Detector Exchanger for 500 and 520 Series Detectors
- FAA-500-TTL Test Adapter with Magnet for 500 and 520 Series Detectors

1.1 Performance Features

- Fulfills the highest aesthetic demands through the flush-mounting design and the possibility of color toning
- Smooth, easily-cleaned detector surface
- Quick and easy insertion and exchange of the detector thanks to innovative detector locking mechanism (click and lock principle)
- Easily-visible two-color LED for display of alarm, trouble and test mode
- Self-monitoring of the sensors, with display on the fire panel:
  - Fault indication upon failure of the evaluation electronics or one of the LEDs of the optical sensor
  - Three-stage contamination display (analog value can be read out at service)
  - Fault indication in the case of heavy contamination (instead of false alarm)
  - Fault indication in the case of CO sensor failure (for the FAP-OC 520)
- Thanks to integrated isolators, the LSN loop will continue to function in case of wire interruption or short-circuit of a detector
- Active adjustment of the threshold (drift compensation) if the optical sensor becomes contaminated
- Active adjustment of the threshold (drift compensation) of the chemical sensor
- Increased detection and false alarm immunity thanks to evaluation of the time behavior of fire and disturbance variables
- Programmable sensitivity, i.e. can be adjusted to the area of operation
- Flexible network structures, including T-taping without additional elements
- Automatic or manual address allocation with or without auto-detection via integrated rotary switches
- Detector individual identification on the fire panel in the case of alarm
- A pre-alarm is signaled when 50 % of alarm threshold is reached (indicator in the event database of the fire panel).
- Serial number, contamination level, operating hours and current analog values can be read out from each configured detector
- Activation of an external detector alarm display is possible (not for relay bases)
- Activation of external devices by the relay base is possible
- Easily-accessible connection terminals
- Service accessories for simple and comfortable detector test and exchange
- When using the FAA-500-TTL test adapter, an integrated reed switch automatically switches the detector into the test mode.
- Can be connected to the LSN fire panels FPA-1200, FPA-5000, BZ 500 LSN, UEZ 2000 LSN, UGM 2020 and to other fire panels or their receiver modules with identical connection conditions.
- EN54-7 and EN54-17 certified

1.2 System Description

All detectors in the 520 Series are equipped with two optical sensors and a pollution sensor. The FAP-OC 520 Multisensor Detector contains a gas sensor as an additional detection channel.
The response sensitivity of the detector can be programmed with the programming software via the LSN network. All sensor signals are analyzed continually by the internal signal evaluation processor and are linked with each other.
By linking the optical sensors and the gas sensor, the OC detector can also be used in places where the work carried out gives rise to small amounts of smoke, steam or dust. The alarm will only be triggered automatically if the signal combination corresponds with the characteristic diagram of the installation location that was selected during configuring.

1.3 Configuration of the Detector

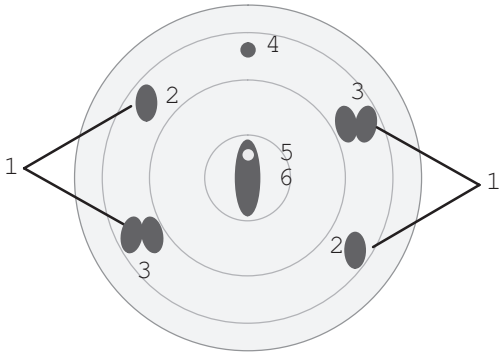


Figure 1.3: Detector front panel with sensors

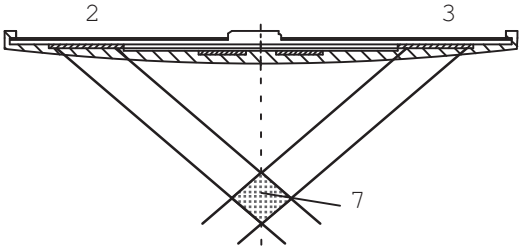


Figure 1.4: Side view of detector cover

Position	Description	Position	Description
1	Optical sensor	5	Two-color LED: red = alarm green = test mode / trouble
2	Receiver (photo diodes)	6	Pollution sensor
3	Transmitter (LEDs)	7	Measuring area
4	CO sensor (only OC-variants)		

1.4 Functional Description of the Sensor Technology

Optical sensor (smoke sensor)
The optical sensor (refer to *Configuration of the Detector, page 7* **(1)**) operates according to the scattered light principle.

The LEDs (refer to *Configuration of the Detector, page 7* **(3)**) transmit light at a defined angle into the measuring area (refer to *Configuration of the Detector, page 7* **(7)**). In case of fire, the light is scattered by the smoke particles and strikes the photo diodes (refer to *Configuration of the Detector, page 7* **(2)**), which transform the quantity of light into a proportional electrical signal.
The effects of daylight and commercial lighting sources are filtered out with an optical daylight filter and by the use of electronic filtering and phase-locked rectification (ambient light stability: dazzling test EN 54-7).
The various light-emitting and photo diodes of the detector are individually activated. Consequently, signal combinations are produced that are independent of each other and ideally suitable for the detection of smoke, which makes it possible to differentiate between smoke and interference agents (insects, objects). In addition, the time characteristics and the correlation of the optical sensor signals for the fire or interference detection are evaluated. Moreover, plausibility checking of the various signals makes it possible to detect errors in the evaluation electronics and the LEDs.

Chemical sensor (CO gas sensor)
The gas sensor (refer to *Configuration of the Detector, page 7* **(4)**, only FAP-OC 520(-P)) detects mainly the carbon monoxide (CO) that is produced by a fire, but it also detects hydrogen (H) and nitrogen monoxide (NO).
The basic measuring principle is CO oxidation on an electrode and the measurable current that arises from this. The sensor signal value is proportional to the concentration of gas. The gas sensor supplies additional information in order to reliably suppress the disturbance variables.
The CO sensor is monitored by supervision of the internal capacity. If the capacity lies outside the permitted range, a malfunction signal is output on the fire panel. In this case, the detector continues to operate purely as a scattered light smoke detector.

Pollution sensor
The contamination level of the detector surface is measured and evaluated continuously by the pollution sensor (refer to *Configuration of the Detector, page 7* **(6)**). A three-stage contamination display can be read out at service (refer to *Maintenance and Service, page 23*).

1.5 LED Operation

The two-color LED of the detector indicates the operation and alarm statuses.
During the whole life cycle, the sensors are self-monitored and the sensitivity is self-adjusted according to the programmed threshold. In case the detector is heavily contaminated, a message is sent to the fire panel.
In case of an alarm, the LED flashes red. The detector is set back to standby if the alarm is reset via the fire panel and if the cause of the alarm is gone.

LED Operation	
Status	**LED**
Standby	off
Alarm	red, flashes
Trouble	off
Test mode	green, flashes once every second

2 Planning Notes

2.1 General Notes

Notice!
The 520 Series Detectors are approved for indoor use only! The detectors must be installed exclusively in the FAA-500 Series Bases provided. In addition, the detector base must be installed in an FAA-500-BB Ceiling Mount Back Box or in an FAA-500-SB-H Surface Mount Back Box.

- Country-specific standards and guidelines must be observed during the planning phase.
- The FAP-OC 520, like the FAP-O 520, is planned according to the guidelines for optical detectors (refer to EN 54 and VDS 2095).
- A hemispherical space **(1)** with a radius of 50 cm must remain free below the detector **(2)**.
  Care must be taken to ensure that no people, larger animals, plants, opening doors or any objects intrude into this area and that no parts of the detector surface become covered.

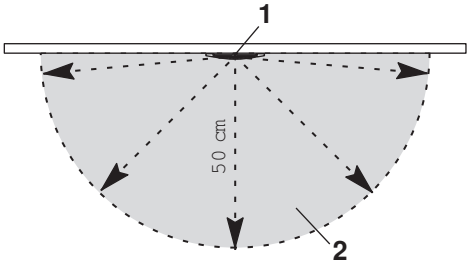


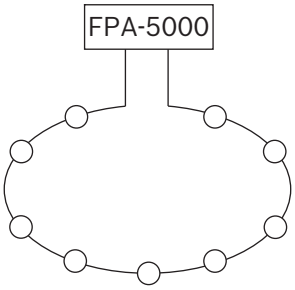
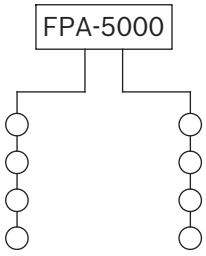
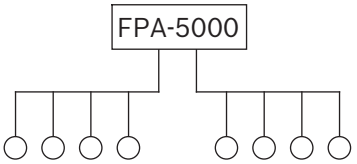
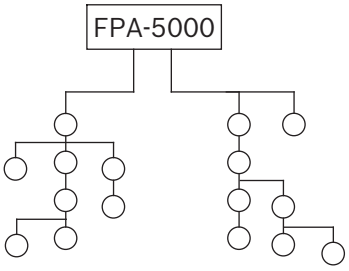
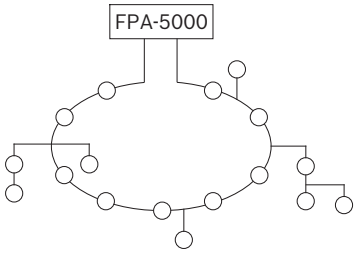
Figure 2.1: Radius

- The detector may only be installed in a position which is out of arm's reach.
  Minimum installation height recommended by BOSCH: 2.70 m.
- The 520 Series Detectors may not be installed in rooms with data transmission by means of high-intensity infra-red light (e.g. in rooms with IR systems for interpreters).
- The detectors must be mounted so that they are not exposed to any direct sunlight.
- A minimum distance of 50 cm from lamps must be maintained.
  The detectors may not be mounted in a cone of light from lamps.
- By default, the bases are equipped with a spring for mounting the detector in concrete and wooden ceilings. This spring is identifiable by the blue marking. For mounting a detector in a false ceiling panel you can use the additional, softer spring in the package identifiable by the yellow marking. (Note that this application does not meet EN54-7).
- Maximum permitted air speed: 20 m/s.

2.2 Network Topologies for LSN Improved

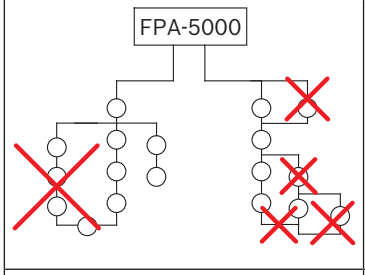
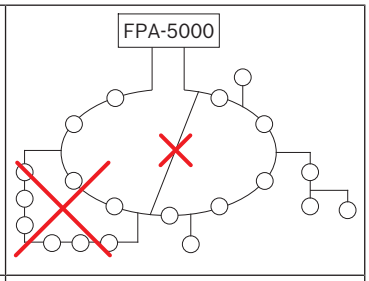
In an improved version Local Security Network (LSN improved), the detectors can be configured as a loop, a stub or T-tap or in any mixed loop or T-tap structures. However, it is important to note that mesh structures cannot be created.
The LSN improved version allows T-taps on stubs or loops and any number of nodes, branches per node and elements per branch as long as the maximum number of elements does not exceed 254.
Connections can be positioned anywhere along the LSN line.

Notice!
Planning should take the anticipated total current and line resistance into account to ensure each detector has an operating voltage of at least 15 V DC.
As soon as an LSN classic device is in a loop or stub, only loop or stub structures can be used. In this case, T-tapping is no longer possible.

		
1: Loop	2: 1 or 2 stubs	3: T-tap
		
4: 1 or 2 stubs and T-taps mixed	5: Loop and stubs mixed with T-taps	

Tab. 2.1: Possible structures in LSN

When configuring the detectors, it is essential to ensure that no mesh structures are created.

	
Mesh structures within a stub structure	Mesh structures within a loop structure

Tab. 2.2: Unusable network structures

3 Installation

Notice!
The 520 Series Detectors may only be installed with an FAA-500 Detector Base in combination with an FAA-500-BB Ceiling Mount Back Box or an FAA-500-SB-H Surface Mount Back Box.

Notice!
By default, the bases are equipped with a spring for mounting the detector in concrete and wooden ceilings. This spring is identifiable by the blue marking. For mounting a detector in a false ceiling panel you can use the additional, softer spring in the package (yellow marking). In this use case, the detector must not be subjected to strong vibrations (> 350 m/s). The shock resistance according to EN 54-7 is not warranted then.

3.1 Ceiling Mount Back Box

Figure 3.1: Ceiling mount back box

The ceiling mount back box (refer to figure) is made of white polypropylene.
It has four cable bushings with tightly-closing rubbers lips of polyflam that are suitable for cable diameters up to 1.4 cm.
When used with a base, approx. 30 cm of cable length can be accommodated in the upper area of the ceiling mount back box.

Notice!
The false ceiling may have a maximum thickness of 32 mm.
Above the false ceiling, a free height of at least 11 cm is required.

- Bore a circular hole with a diameter of 130 mm (tolerance -1 mm to +5 mm) in the false ceiling.

Notice!
A hole saw with Ø 133 mm can be obtained from:
Wittmann-Komet, Metal Cutting Saws GmbH & Co. KG, Alte Str. 28, D-79576 Weil am Rhein, Tel. ++49-7621-9783-0, www.wittmann-komet.de

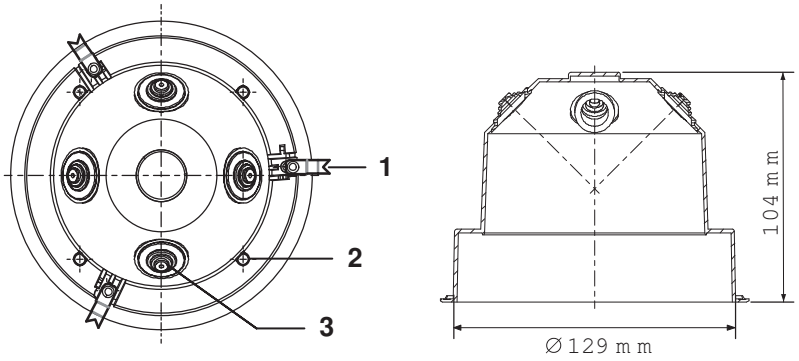


Figure 3.2: Plan view and side view of the ceiling mount back box FAA-500-BB

Position	Description	Position	Description
1	Bracket	3	Cable bushing
2	Screws for fastening base		

1. Pull the cable through one of the cable bushings **(3)**. A cable tie around the cable sheath will secure the cable against being pulled out accidentally.
2. Insert the ceiling mount back box in the false ceiling from below.
3. A triangular marking **(M)** is impressed into the outer edge of the ceiling mount back box. Turn the ceiling mount back boxes so that all markings are in a line. In this way, the long, middle windows of the detectors will later appear in a line to give a harmonious overall visual effect.
4. Tighten the brackets **(1)**.

Notice!
It is recommended that for the usual, soft false ceiling panels, you do not use a cordless screwdriver.

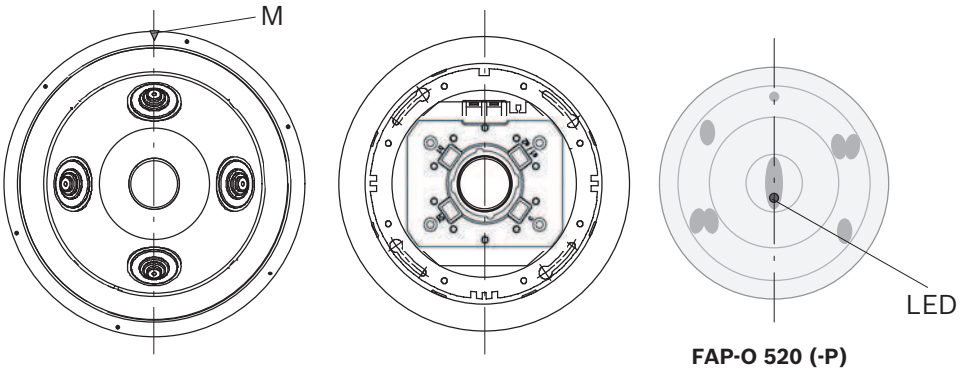


Figure 3.3: Alignment of ceiling mount back box, base and detector

3.2 Detector Base/Detector Base with Relay

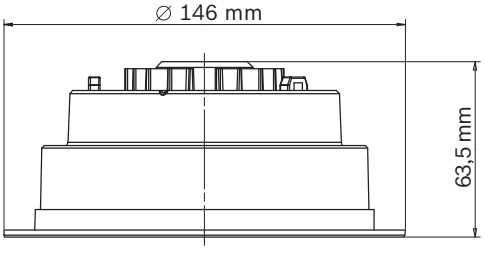


Figure 3.4: Side view of base

The base housings (refer to figure) are made of white polycarbonate.
The screw terminals (for cables with cross section from 0.3 mm^2 to 3.3 mm^2) guarantee a secure electrical connection through the clamped contacts when mounting the detector. The bases are provided with three mounts for cable ties. These can be used for fastening the base during the wiring-up.

Notice!
Detector bases with relay (FAA-500-R) can only be used in combination with the modular fire panel series 1200 and 5000.
In cases where relay bases are used, no external detector alarm display can be connected.

Connecting the base

Wire up the LSN base according to the labeling in the outer ring **(3)**.

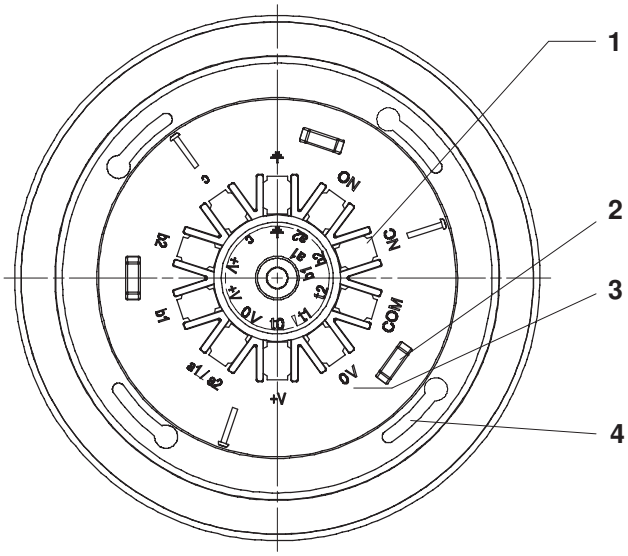


Figure 3.5: Plan view base

Position	Description	Position	Description
1	Connection terminals	3	Labeling on LSN connections
2	Mount for cable ties	4	Fastening slot

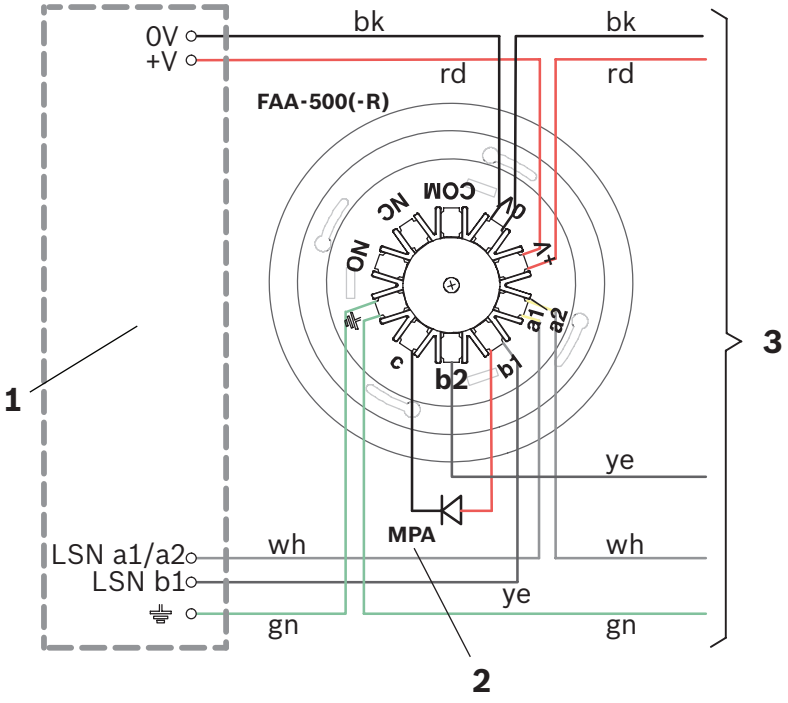


Figure 3.6: Connection of bases

Position	Description	Position	Description
1	Fire panel	3	Next detector
2	Remote indicator (optional), not for relay bases		

Connection	Terminal	Wire
Voltage - *	0V	black (bk)
Voltage + *	+V	red (rd)
LSN a in/out	a1/a2	white (wh)
LSN b in	b1	yellow (ye)
LSN b out	b2	yellow (ye)
Remote indicator output	c	
Shielding		[green (gn)]
Relay outputs** (only FAA-500-R)	NO	
	NC	
	COM	
* Terminals for looping through the power supply for other LSN elements		
**For switching capacity refer to *Detector Base, page 29*		

The base is fastened into the ceiling mount back box with four screws. It can be rotated in the long slots through an angle of 20° so that fine alignment is possible.

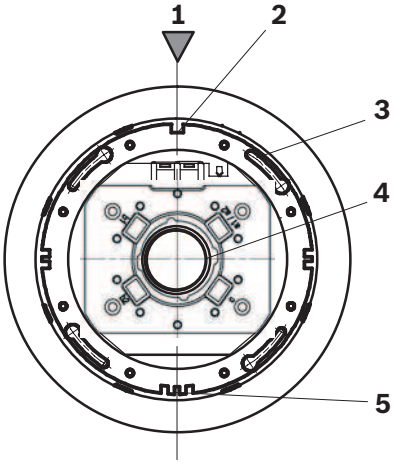


Figure 3.7: Placing the base in the ceiling mount back box

Position	Description	Position	Description
1	Alignment of the marking on the ceiling mount back box	4	Spring
2	Single guide-groove	5	Triple guide-groove
3	Long slot for fastening the base		

1. Place the base in the ceiling mount back box so that the marking on the backbox **(1)** coincides with the single guide-groove on the base **(2)**.
2. Turn the base until the fastening screws are approximately in the middle of the long slots **(3)**.
3. Adjust the bases around this position until they appear in a line.
4. Tighten the four screws.

3.3 Address Allocation

The detector's address is allocated by setting three rotary switches located on the back of the device.
Use a flat-bladed screwdriver to position each switch. The switches will click when turned.
All detectors delivered ex factory are set to 0 0 0.

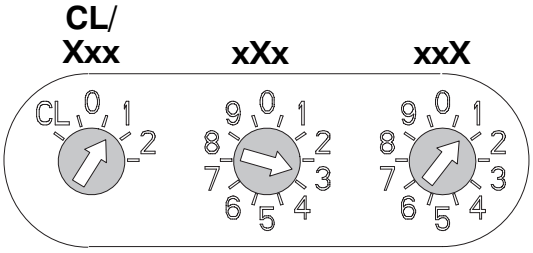


Figure 3.8: Rotary switches

Position	Description	Position	Description
CL	LSN classic mode	xXx	Tens
Xxx	Hundreds	xxX	Ones

When connecting the detectors to the LSN fire panels BZ 500 LSN, UEZ 2000 LSN or UGM 2020, all detectors have to be addressed by CL 0 0.
When connecting the detectors to the Modular Fire Panel FPA1200/FPA-5000, the address allocation is done automatically or manually.
In case of a manual allocation, all detectors of the same loop, stub or T-tap have to have an address between 001 and 254. Addresses between 255 and 299 are not allowed and produce a fault message on the fire panel.
If the addresses shall be allocated automatically by the fire panel, all detectors must have the address 0 0 0.

Address	Operating mode	Fire Panel
CL 0 0	Loop/stub in classic LSN mode	BZ 500 LSN UEZ 2000 LSN UGM 2020 FPA 1200 FPA 5000
0 0 1 - 2 5 4	Loop/stub/T-tap system in LSN improved mode with manual addressing	FPA 1200 FPA 5000
0 0 0	Loop/stub in LSN improved mode with automatic addressing (T-tap system not possible)	FPA 1200 FPA 5000

3.4 Detector and Trim Ring

Notice!
The packaging of the detectors with C sensor consists of tear-resistant PE-ALU laminated film and must be cut open carefully.
Do not remove the protective film until the detector is ready to be fitted.

Inserting the color rings

Notice!
Do not switch detector front plates.
The pollution sensor is calibrated individually for each detector and its front plate.
Switching front plates can result in a display of wrong pollution values.

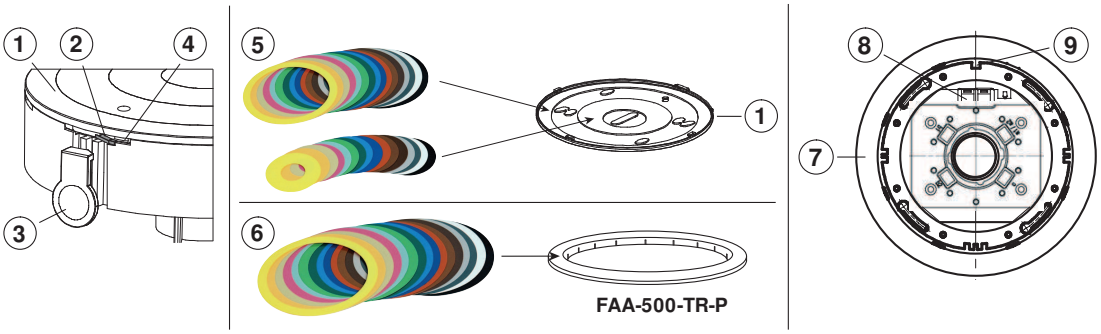


Figure 3.9: Inserting color rings, detector and trim rings

1. The detector front panel **(1)** is secured with a small snap-fit hook **(2)** on the triple groove at the side. Insert the supplied opener **(3)** into the slot above the snap-fit hook **(4)**, fasten the opener with the thumb and rotate the front panel anti-clockwise.
2. The desired color rings from the supplied set **(5)** are laid on the front panel **(1)** and the detector placed on top. The front panel will only fit in one position.
3. Rotate the front panel clockwise until it engages. The sensor window must remain unobstructed.
4. Insert the desired color ring into the FAA-500-TR-P Trim Ring **(6)**.

Inserting the detector and trim ring

Notice!
The FAA-500-RTL Detector Exchanger is recommended for inserting and removing the detectors.

1. Push the trim ring onto the base until it is heard to engage **(7)**.
2. Remove the protective film from the detector surface.
   During initial set-up, the system will detect that a detector does not have a protective film and signal an O-malfunction.
3. Insert the detector and press it gently upwards. Locking is achieved by a click and lock mechanism.
   The guide grooves ensure the detector can only be inserted into the base in the correct position.
   In the case of very high installation heights: The two easily-visible contact faces **(8)** are on the same side as the single guide-groove **(9)**.

Removing the detector and trim ring

1. To remove, push the detector gently upwards in the middle. In this way the locking is released.
2. To take off the trim ring, carefully lift it up on one side.

3.5 Built-in Housing for Concrete Ceilings

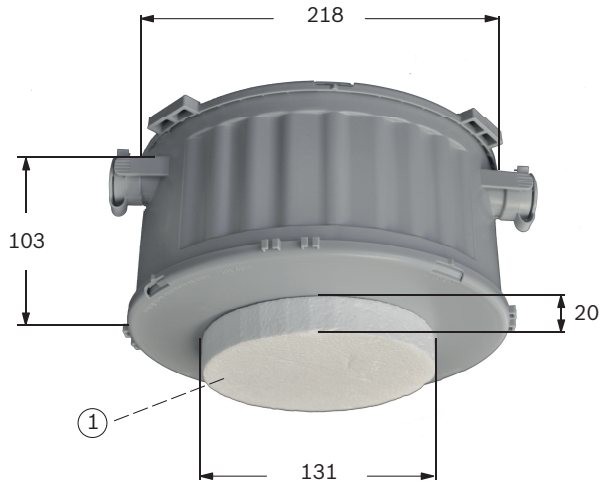


Figure 3.10: FAA-500-CB built-in housing

The FAA-500-CB Built-in Housing is used for the installation of the detector into concrete ceilings. It allows for easy connection of conduits.

The FAA-500-CB Built-in Housing is placed on the concrete form, fastened and secured against floating. During fastening make sure the nails are located in the area of the Styrofoam, to prevent interference when cutting the Styrofoam.

Pipe or cable inlets at the FAA-500-CB Built-in Housing within the wall areas are made with a universal cutting tool. After removing the form-boards, the front part **(1)** is opened with a fret-saw or hole saw.

Into the hole of the built-in housing, a FAA-500-BB Ceiling Mount Back Box is then inserted which takes base and detector.

3.6 Surface Mount Back Box

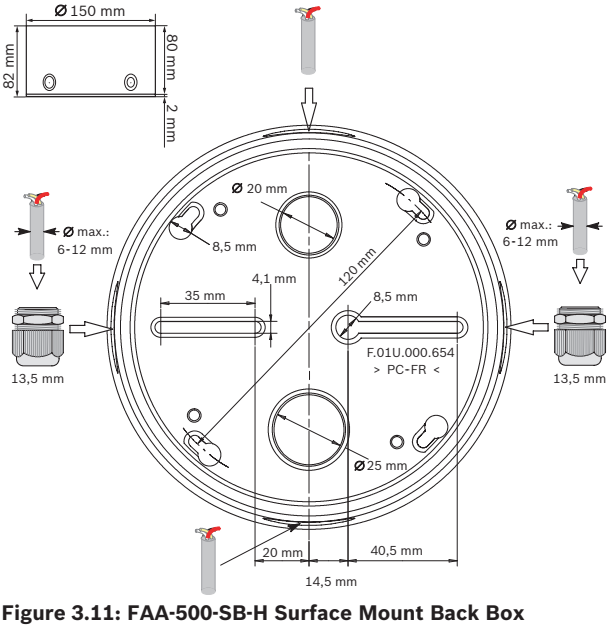
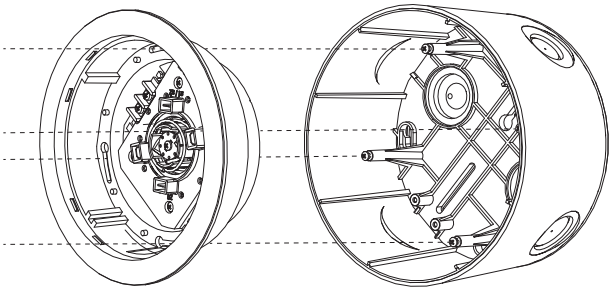


Figure 3.11: FAA-500-SB-H Surface Mount Back Box

The FAA-500-SB-H Surface Mount Back Box allows flush and surface cable duct. The box has a seal for damp rooms.

For surface cable duct use the side knockouts. For flush cable duct, there are two openings in the bottom.

Using 13.5 mm cable glands, the maximum cable gauge is 12 mm.
Mounting occurs:
– via the elongated slots or
– via the four mounting holes to mount directly to 4 inch electrical boxes or single gang switch boxes (for US)



FAA-500/FCA-500 FAA-500-SB-H

Figure 3.12: Fastening points for mounting

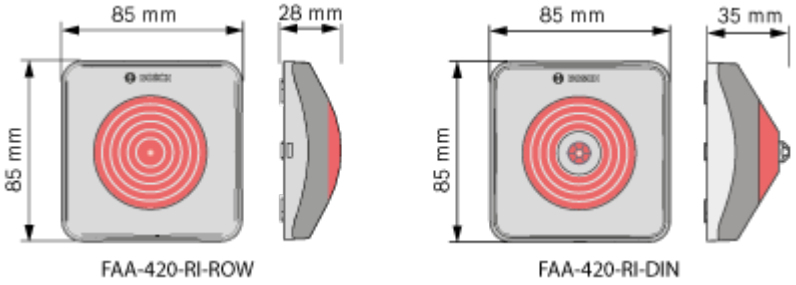
The base is mounted inside the back box via four fastening points.

3.7 Remote indicator

A Remote Indicator is required if the detector is not directly visible or has been mounted in false ceilings or floors.
The remote indicators should be installed in corridors or access pathways to the corresponding building sections or rooms.

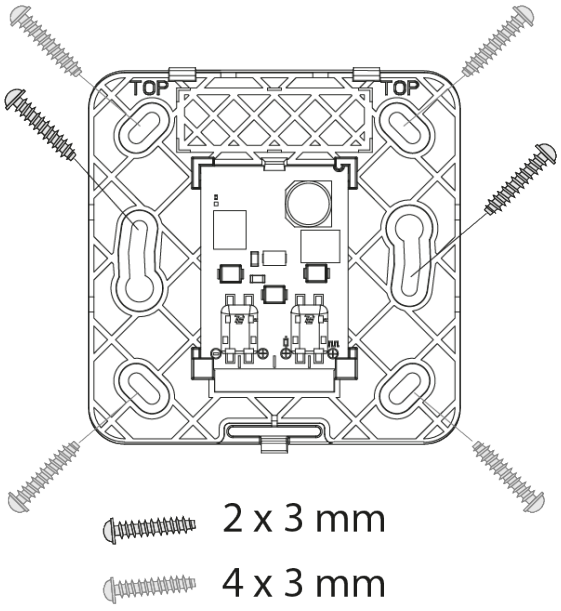
Notice!
When using unshielded cables for the connection of the remote indicator, the maximum cable length is 3m. No limitation when using shielded cables.

Installation of the FAA-420-RI Remote Indicator

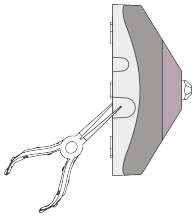


Warning!
Malfunction and Damage
If maximum current consumption of the connected detector is larger than 20 mA, it can result in malfunction and damage to the remote indicator.
a) Ensure, that the maximum current consumption of 20 mA is not exceeded
b) Use point-type automatic Bosch detectors, which have an internal resistor that limits the current consumption.

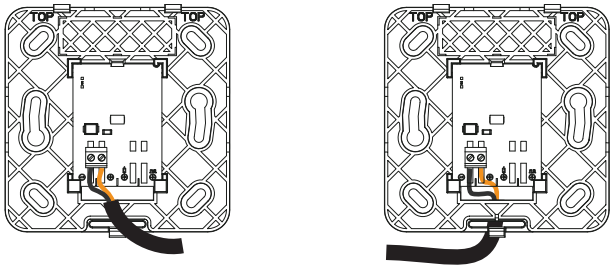
Before assembly remove the cap from the base plate
1. Unlock the snap-fit hook by pressing on it with a flat object and lift the cap carefully
2. Remove the connection board for easy access.
3. Mount the base plate directly on a dry, level surface with two or four screws.



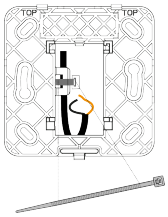
1. For surface-mounted cables, break out the prepunched cable entries.



2. For flush-mounted cables, insert the cable through the opening under the connection board.



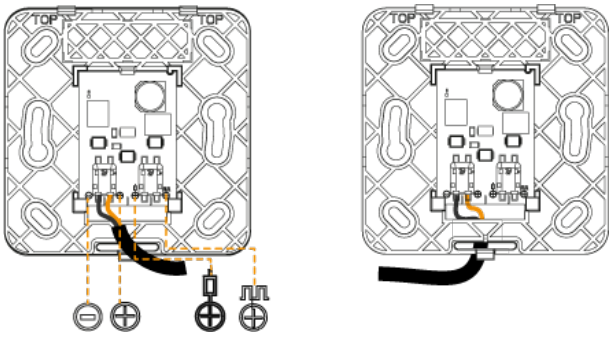
3. Secure the cable with a zip tie on the base plate.

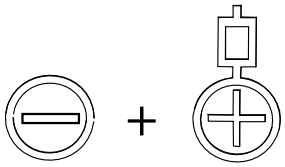
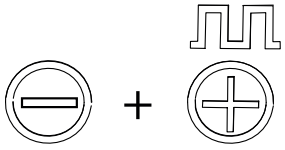


FAA-420-RI-DIN

Warning!
Malfunction and Damage
Note the maximum permitted current supply respectively the input voltage range of the functional modes.

- Wire the remote indicator as shown.



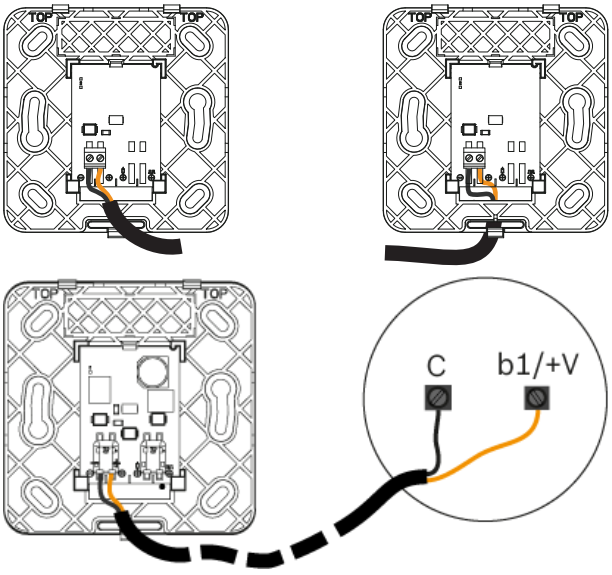
Mode	Terminal connection	Alarm condition
1		The remote indicator shows steady red light.
2		The remote indicator shows steady red light.
3		The remote indicator shows flashing red light.

Operate in mode 1 and 3 only, when connected to LSN detectors.

1. Place the cap on the base plate in such a way that the two hooks are inserted into the slits.
2. Press the cap lightly onto the base plate until the snap-fit-hook engages.

FAA-420-RI-ROW

1. Wire the remote indicator as shown.



2. Place the cap on the base plate in such a way that the two hooks are inserted into the slits.
3. Press the cap lightly onto the base plate until the snap-fit-hook engages.

4 Programming

LSN detectors are programmed according to the required operating mode.
Programming is carried out with the programming software using a PC or laptop connected to the fire panel.
The suitable response sensitivity of the multisensor detector is programmed by specifying the operating location (e.g. computer room, office, large kitchen). The selection of the operation location determines the optimal characteristic diagram for the fire and disturbance variable evaluation.
If, according to the operating location, a low sensitivity is set for the optical sensor, the alarm goes off only if the detector senses high levels of smoke and of CO at the same time. This is the case with open or smouldering fire.
Programming the multisensor detector and linking all detectors by algorithms, considerably increases the fire detection reliability and lowers the false alarm rate.

Operating locations for multisensor fire detector (FAP-OC 520) selectable via the programming software	**Sensitivity**	
	O unit	**C unit**
Office (smokers) / waiting room / restaurant / conference room	low	The sensitivity of the C unit is always equally high, regardless of the operating location
Conference room / waiting room / exhibition hall	low	
Warehouse with vehicle traffic	low	
Production facilities	low	
Kitchen / casino / restaurant during operation	low	
Garage	low	
Office (daily operation)	medium	
School / kindergarten	medium	
Theaters / concert halls	medium	
Office (no traffic)	high	
Computer room	high	
High-board warehouse without vehicle traffic with internal combustion engines	high	

In the case of the optical FAP-O 520 detector, the sensitivity of the optical sensors can be set on three levels. Depending on the operating location, the optical sensor of the detector is thus adjusted to the environmental conditions. For fire detection, also the time behavior of the fire characteristics is evaluated. This is very different from the time behavior of the disturbance variables.

Operating location and recommended setting for optical fire detector (FAP-O 520) selectable via the programming software	**Sensitivity O unit**
Office (smokers) / waiting room / restaurant / conference room	low
Conference room / waiting room / exhibition hall	low
Warehouse with vehicle traffic	low

Operating location and recommended setting for optical fire detector (FAP-O 520) selectable via the programming software	Sensitivity O unit
Production facilities	low
Office (daily operation)	medium
School / kindergarten	medium
Theaters / concert halls	medium
Office (no traffic)	high
Computer room	high
High-board warehouse without vehicle traffic with internal combustion engines	high

Notice!
For execution of the function test for the FAP-O 520 and FAP-OC 520 detector, the detector must be switched to test mode. This can be carried out via the fire panel or via the reed switch at the detector with the help of a magnet (see *Maintenance and Service, page 23*).

5 Maintenance and Service

For maintenance and inspection work on security systems, the regulations laid down in DIN VDE 0833 strictly apply in Germany; these refer to the maintenance intervals specified by the manufacturer.

Notice!
The 520 Series Detectors do not require to be removed from their bases for routine maintenance.
If occasionally a detector requires replacement due to a design change or damage to the device then this should be carried out by a qualified engineer.
This should only be undertaken when the system is offline and the user has made alternative arrangements for emergency evacuation.

- Maintenance and inspection work should be carried out regularly and by trained technical personnel.
- Bosch recommends a functional and visual inspection at least once a year.

Test steps	Detector type	
	O	OC
Check of the LED display	X	X
Visual check of the mounting	X	X
Visual inspection for damage and contamination of the detector surface	X	X
Check monitoring area for limitations of function and interference caused by lamps	X	X
Test of the optical sensors (see *Inspection Procedure for FAP-O 520, page 26*)	X	-
Combined test with detector test device and CO testing gas (see *Inspection Procedure for FAP-OC 520, page 25*)	-	X

FAP-OC 520

Notice!
Due to the life expectancy of the gas sensor, the FAP-OC 520 detector switches off the C sensors after approx. 5 years of operation. The detector will continue to function as an O detector. An according fault indication is displayed on the fire panel.
Exchange the detector immediately in order to keep up the higher detection reliability of the OC detector.

Notice!
The cleaning intervals depend on the environmental conditions.

The detector can be wiped over with a soft cloth and a proprietary plastic cleaning agent. Cleaning should only take place in test mode.

5.1 Notes for the Service

Notice!
The serial number, contamination level, operating hours and current analog values can be read out at all configured detectors (BZ 500 LSN, UEZ 2000 LSN, UGM 2020: via WinPara, FPA-1200/FPA-5000: via panel display).

Contamination level: The contamination level is given as a percentage:

Contamination level	Fire panel display	Required action
Light (> 50 %)	LS contam	Clean at next service
Moderate (> 75 %)	LS dusty	Reliability of detection is still guaranteed, clean as soon as possible
Heavy (100 %)	LS malfunction	Reliability of detection no longer guaranteed, fault indication at the fire panel

Operating hours: Display of the operating time in hours since first putting into operation.
Current measurement values:
Analog smoke value of the scattered light sensor:

Detector state	Value
New detector, as supplied	< 300
Light contamination	> 500
Heavy contamination	> 600
Malfunction will be triggered	> 700
Maximum measurement value	1023

CO value: Current measurement value of the CO sensor (only in the case of FAP-OC 520). The maximum measurement value is 1023.

5.2 General Notes for Detector Testing

The FAP-OC 520 detector has an additional sensor for CO detection in case of fire. The CO sensor provides improved response behavior and increased stability against nuisance alarms in critical environmental conditions.
For fire detection, FAP-520 detectors use the time behavior of the fire characteristics, which differs from the time behavior of disruption variables. Therefore, for a functional test, the detector must be switched to test mode. Switching to test mode can occur in two ways, which are described in the alternative test procedures (see below).

Notice!
Detectors that are programmed for two-detector dependency must be tested in accordance with the first alternative (in test mode).

For the detector test you need:
– Detector test device for optical fire detector and
– FAA-500-TTL test adapter with magnet
For the OC detector you need in addition a CO testing gas for detector with CO sensor.

5.3 Inspection Procedure for FAP-OC 520

5.3.1 1. Alternative

1. On the central unit, switch the detector zone to be inspected into test mode. This automatically sets the detector into revision operation and readies it for the detector test. Only in revision operation the detector's individual sensors will trigger with the corresponding test device. For an alarm, all sensors must trigger at the same time. The C sensor is triggered using CO test aerosol, the O sensors by being covered up. No O testing gas is required.
2. Now hold the test device under the detector so that the test beaker is flush with the trim ring and seals it tightly.
   Make sure that the test beaker does not tilt, which could cause the detector to be lifted up and consequently become detached from its fastening.
3. Spray the CO testing gas for approximately 1 sec.
   The test head must remain over the detector until the detector has been triggered. Distribution of the CO testing gas in the test head and therefore the sensor trigger time can take up to 20 sec.
4. Both scattered light areas are covered by the test beaker, so that both optical sensors are also triggered at the same time.
5. The detector triggers the alarm and the red alarm LED flashes.

5.3.2 2. Alternative

The detector can be tested in normal operation if a test device with magnet is used.

Notice!
Make sure that the alarm cannot be passed on to higher-level systems. Programmed activations of the central unit are retained and are executed.

The figure shows the position of the reed switch (Pos. R) in the case of OC detectors.
If you imagine the CO sensor (Pos. CO) to be in a 12 o'clock position, the reed switch (Pos. R) is located at approximately 2 o'clock.

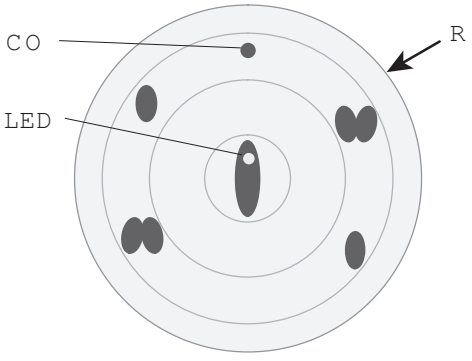


Figure 5.1: Position of reed switch

1. Bring the magnet close to the reed switch.
2. The LED of the detector flashes green once a second as soon as the reed switch has been triggered. The detector will now remain in test mode for 60 sec with automatically set test parameters (e.g. reduction of the delay time to 15 sec). The green LED flashes for as long as the detector remains in test mode.
3. Now hold the test device under the detector so that the test beaker is flush with the trim ring and seal it tightly.

Make sure that the test beaker does not tilt, which could cause the detector to be lifted up and consequently become detached from its fastening.

4. Proceed as in the case of the first alternative:
   – spray with CO gas
   – leave the test device on the detector for approx. 20 sec, until the alarm is triggered

Notice!
In the case of programmed intermediate alarm storage, longer trigger times occur.

1. Both scattered light areas are covered by the test beaker, so that both optical sensors are triggered as the same time as the CO sensor (no O testing gas is required).
2. The detector triggers the alarm and the red alarm LED flashes.

5.4 Inspection Procedure for FAP-O 520

5.4.1 1. Alternative

1. On the fire panel, switch the detector zone to be inspected to test mode. This automatically sets the detector into revision operation and readies it for the detector test.
2. Hold a sufficiently large object (e.g. the detector test device or the detector exchanger) in both scattered light areas until an alarm is triggered. No O testing gas is required.

5.4.2 2. Alternative

The detector can be tested in normal operation if a test device with magnet is used.

Notice!
Make sure that the alarm cannot be passed on to higher-level systems. Programmed activations of the central unit are retained and are executed.

The figure shows the position of the reed switch (Pos. R) in O detectors.
If you imagine a line through the detector LED to be at the 12 o'clock position, the reed switch (Pos. R) is located at approximately 2 o'clock.

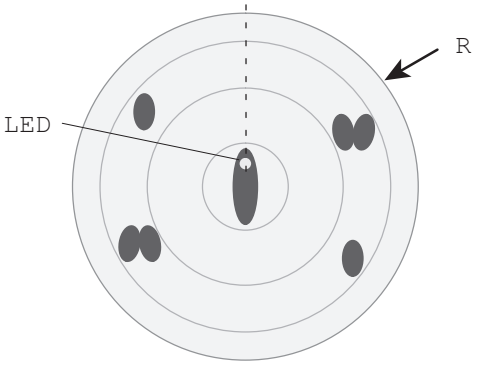


Figure 5.2: Position of reed switch

1. The LED of the detector flashes green once a second as soon as the reed switch has been triggered.
   The detector will now remain in test readiness for 60 sec with automatically set test parameters (e.g. reduction of the delay time to 15 sec). The green LED flashes for as long as the detector remains in test readiness.

2. Now hold the test device under the detector so that the test beaker is flush with the trim ring. By covering the scattered light areas, both optical sensors are triggered simultaneously (no O testing gas is required).
3. The detector triggers the alarm and the red alarm LED flashes.

Notice!
In the case of programmed intermediate alarm storage, longer trigger times occur.

5.5 Repair

In the event of any defect, the entire module/device is exchanged.

5.6 Disposal

Unusable electrical and electronic devices/modules must not be disposed of with normal household refuse. They must be disposed of in compliance with the applicable regulations and directives (e.g. WEEE in Europe).

Packaging Film of the Fire Detectors with C sensor:
The packaging bag of the multisensor detectors with C sensor consists of tear-resistant PE-ALU laminated film and may be disposed of with the household garbage.

6 Technical Data

6.1 Detector and Trim Ring

Detector type	FAP-OC 520 / FAP-OC 520-P	FAP-O 520 / FAP-O 520-P
Detection principle	Combination of scattered light and combustion gas measurement	Scattered light measurement
Special features	– Contamination detection – Drift compensation in optical and in gas measuring unit	– Contamination detection – Drift compensation in optical unit
Address allocation	Manual or automatic address setting via rotary switches	
Operating voltage	15 to 33 V DC	
Current consumption	3.25 mA	
Individual display	Two-color LED: red/green	
Alarm output	By data word via two-wire signal line	
Indicator output	Open collector, switches 0 V over 1.5 kΩ, max. 15 mA	
Response sensitivity:		
– O unit	< 0.36 dB/m (EN 54-7)	< 0.18 dB/m (EN 54-7)
– Gas unit	in ppm-range	-
Max. monitoring area	120 m^2 (note local guidelines)	
Maximum installation height	16 m (note local guidelines)	
Minimum installation height	Out of arm's reach	
Minimum distance to lamps	50 cm	
Permitted air speed	20 m/s	
Permitted operating temperature	-10 °C to +50 °C	-20 °C to +65 °C
Permitted relative humidity	<95 % (non-condensing)	
Protection class as per IEC 60529	IP 33	IP 53
Dimensions:		
– Detector without trim ring	Ø 113 mm x 55 mm (without base)/Ø 113 x 70 mm (with base)	
– Detector with trim ring	Ø 150 mm x 55 mm (without base)/Ø 150 x 70 mm (with base)	

Detector type	FAP-OC 520 / FAP-OC 520-P	FAP-O 520 / FAP-O 520-P
Housing material	Polycarbonate	
Color of detector housing	Signal white (RAL 9003)	
Color of detector front panel:		
– White variant	Signal white (RAL 9003)	
– Transparent variant (-P)	Transparent/silver gray, (RAL 7001)	
Weight (without/with pack.):		
– Detector	Approx. 180 g/370 g	Approx. 170 g/360 g
– Trim ring FAA-500-TR(-P)	Approx. 30 g/60 g	

6.2 Detector Base

Base type	FAA-500	FAA-500-R (with relay)
Special note	-	For connection to FPA-5000 only
Connections	Screw terminals for: – Power supply (0V, +V) – LSN (a-in/out, b-in, b-out) – C-point – Shielding	Screw terminals for: – Power supply (0V, +V) – LSN (a-in/out, b-in, b-out) – C-point – Shielding – Relay (NO, NC, COM)
Current consumption	-	0.2 mA
Load capacity of relay contact	-	1 A, 30 V DC
Cable cross section	0.3 mm^2 - 3.3 mm^2 (22 AWG - 12 AWG)	
Material and color	Polycarbonate, signal white (RAL 9003)	
Dimensions (Ø x H)	145.6 x 63.5 mm	
Weight (without/with pack.)	Approx. 200 g/280 g	Approx. 210 g/290 g

6.3 Mounting Boxes

FAA-500-BB Ceiling Mount Back Box	
Mounting dimensions:	
– Thickness of the false ceiling	Max. 32 mm
– Required bored hole	Ø 130 mm (tolerance -1 mm to +5 mm)
– Installation height	11 cm
Max. cable diameter	1.4 cm

FAA-500-BB Ceiling Mount Back Box	
Material and color	Polypropylene/white
Dimensions (Ø x H)	140 x 104 mm
Weight (without/with pack.)	Approx. 100 g/200 g

FAA-500-CB Built-in Housing for concrete ceilings	
Material and color	Plastic/polystyrene Gray
Dimensions (Ø x H)	218 x 103 mm
Weight	Approx. 340 g

FAA-500-SB-H Surface Mount Back Box with damp room seal	
Housing (back box/seal):	
– Material	Polycarbonate (PC-FR)/TPE
– Color	White/transparent
Cable entries	– 2 x Ø 20 mm (pre-punched) for cable gland 13.5 mm – 2 x Ø 25 mm (pre-punched)
Dimensions (Ø x H)	150 x 82 mm
Weight	Approx. 225 g

6.4 Remote indicator

Technical specifications

	FAA-420-RI-ROW	FAA-420-RI-DIN
Operating Voltage	depends on current feed	– Operating mode 1: depends on current feed – Operating mode 2: 8,5 to 33 V DC – Operating mode 3: 11 to 33 V DC
Current feed	3 to 30 mA	– Operating mode 1: 3 to 30 mA – Operating mode 2: 11 to 14 mA – Operating mode 3 : 3 mA
Permissible wire gauge	0,4 - 1,3 mm	0,6 - 1,0 mm
Display medium	1 LED	2 LED
Dimensions	85 x 85 x 28 mm	85 x 85 x 35 mm
Weight	45 g	65 g

7 Appendix

7.1 Abbreviations

a.P.	auf Putz (surface-mounted)
ABS	AcrylonitrileButadieneStyrene
DIBt	Deutsches Institut für Bautechnik (German Institute for Building Technology)
DIN	Deutsches Institut für Normung e.V. (German Institute for Standardization)
EN	Europäische Norm (European standard)
FAA	Fire Analog Accessory
FACP	Fire Alarm Control Panel
FAP	Fire Analog Photoelectric
FCA	Fire Conventional Accessory
FCP	Fire Conventional Photoelectric
GLT	Gleichstromlinientechnik (conventional technology)
LED	Light Emitting Diode
LSN	Lokal SecurityNetwork
NVU	Netz-Verarbeitungsumsetzer (network processing converter)
O	Optical (smoke)
OC	Optical (smoke), chemical (gas)
PC	Polycarbonate
PI	Product information
PP	Polypropylene
u.P.	unter Putz (flush-mounted)
UEZ	Universelle Europazentrale (universal European fire panel)
UGM	Universelle Gefahrenmeldezentrale (danger detection system)
VDE	Verband Deutscher Elektrotechniker e.V. (Association of German Electrical Engineers)
VdS	VdS Schadenverhütung GmbH (company name)

7.2 Order Overview

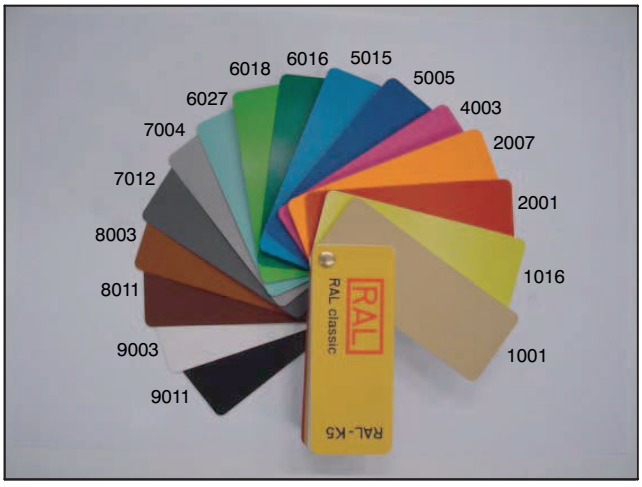
7.2.1 Detector and Trim Ring

Description	Product ID
FAP-O 520 Optical Fire Detector LSN improved, white	F.01U.510.149
FAP-OC 520 Multisensor Fire Detector LSN improved, optical/chemical, white	F.01U.510.151

Description	Product ID
FAP-O 520-P Optical Fire Detector LSN improved, transparent with color toning inserts	F.01U.510.161
FAP-OC 520-P Multisensor Fire Detector LSN improved, optical/chemical, transparent with color toning inserts	F.01U.510.162
FAA-500-TR-W Trim Ring, White, for the detectors FAP-O 520 and FAP-OC 520	4.998.151.295
FAA-500-TR-P Trim Ring, Transparent, with color toning inserts for FAP-O 520-P and FAP-OC 520-P detectors	4.998.151.296

Color toning inserts for FAP-O 520-P, FAP-OC 520-P and FAA-500-TR-P:

Color	RAL
beige	1001
sulfur yellow	1016
red orange	2001
fluorescent orange	2007
erica violet	4003
signal blue	5005
sky blue	5015
turquoise green	6016
yellow green	6018
light green	6027
signal gray	7004
basalt gray	7012
earth brown	8003
nut brown	8011
signal white	9003
graphite black	9011



7.2.2 Detector Bases/Remote indicators

Description	DU*	Product ID
FAA-500 LSN Detector Base	PE	4.998.151.297
FAA-500-R LSN Detector Base with relay (for connection to FPA-5000 only)	PE	4.998.151.299
FAA-420-RI-DIN Remote indicator for DIN application	PE	F.01U.289.620
FAA-420-RI-ROW Remote indicator	PE	F.01U.289.120

7.2.3 Mounting Boxes

Description	DU*	Product ID
FAA-500-BB Ceiling Mount Back Box	PE	4.998.151.302
FAA-500-CB Built-in Housing for concrete ceilings	PE	F.01U.508.713
FAA-500-SB-H Surface Mount Back Box with damp room seal	PE	F.01U.510.166

7.2.4 Service tools/accessories

Description	DU*	Product ID
FAA-500-RTL Detector Exchanger for 500 and 520 Series Detectors	PE	F.01U.508.720
FAA-500-TTL Test Adapter with Magnet for 500 and 520 Series Detectors	PE	F.01U.508.725
Test Device for Optical Fire Detectors	PE	4.998.112.071
Test gas for smoke detector + CO sensor for multisensor detectors with C-sensor, DU = 12 pieces.	PU	F.01U.301.469
Telescopic Pole (1 m to 3.38 m) made of fiberglass, can be extended with max. 3 extension poles	PE	4.998.112.069
Extension Pole made of fiberglass (1 m)	PE	4.998.112.070
Transport Bag for test devices and accessories	PE	4.998.112.073

* DU = delivery unit, PE = pieces, PU = packaging unit

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