Conventional Automatic Fire Detectors

FCP-O 500 | FCP-O 500-P | FCP-OC 500 | FCP-OC 500-P

BOSCH

en Operation Guide

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1   Product Description

Figure 1.1   500 Series Fire Detector

With their low profile design, flush-mounted installation and possibilities for color toning, the fire detectors in the 500 series open up a new dimension with respect to aesthetic and functional demands.

The cooperation of engineers and designers has created the timeless, innovative design of this detector, which integrates pleasantly into the ceiling. 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).

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 FCP-500 series are conventional technology detectors. Due to their current consumption, a four-wire connection is required. Thus, they can be operated with numerous different fire panels.

Accessories

The 500 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.

All bases have an integrated strain relief for false ceiling 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 500 Series Conventional Detectors and Accessories
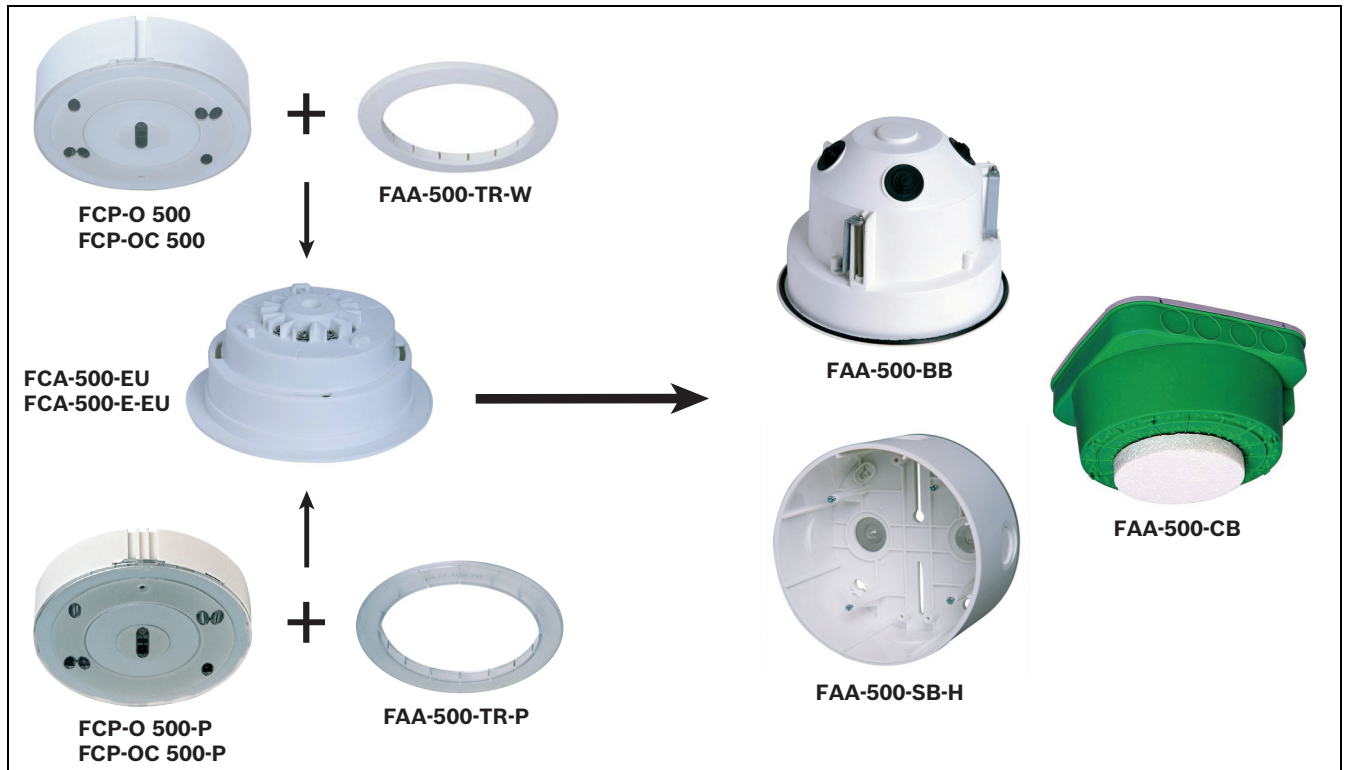
Figure 1.2   500 Series Detectors and Accessories

Conventional Detectors:

- FCP-O 500	Conventional Optical Fire Detector, white
- FCP-O 500-P	Conventional Optical Fire Detector, transparent with color toning inserts
- FCP-OC 500	Conventional Multisensor Fire Detector, optical/chemical, white
- FCP-OC 500-P	Conventional Multisensor Fire Detector, 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

Conventional Detector Bases:

- FCA-500-EU	Conventional Detector Base
- FCA-500-E-EU	Conventional Detector Base with EOL resistor

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: contamination level can be read in test mode
- 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
- Activation of an external detector alarm display is possible (not for relay bases)
- 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 (display via detector LED, flashes green once per second).
- The EMC security fulfills the guidelines according to VdS 2110 (VdS Schadenverhütung GmbH) as well as UL 268.
- Can be connected to the conventional fire panels BZ 1012/1016/1024/1060, universal European fire panel UEZ 2000 LSN, universal danger detection system UGM 2020, to the CZM 0004 module of the Modular Fire Panel FPA-5000, and to other fire panels or their receiver modules with identical connection conditions.
- VdS Approval
- CE conform according to EN 54-7

1.2 System Description

All detectors in the 500 Series are equipped with two optical sensors and a pollution sensor. The FCP-OC 500 Multisensor Detector contains a gas sensor as an additional detection channel.

All sensor signals are analyzed continually by the internal signal evaluation processor and are linked with each other by specially developed algorithms.

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 detector's programmed characteristic diagram. Consequently, an extremely high tolerance to unwanted alarms is achieved.
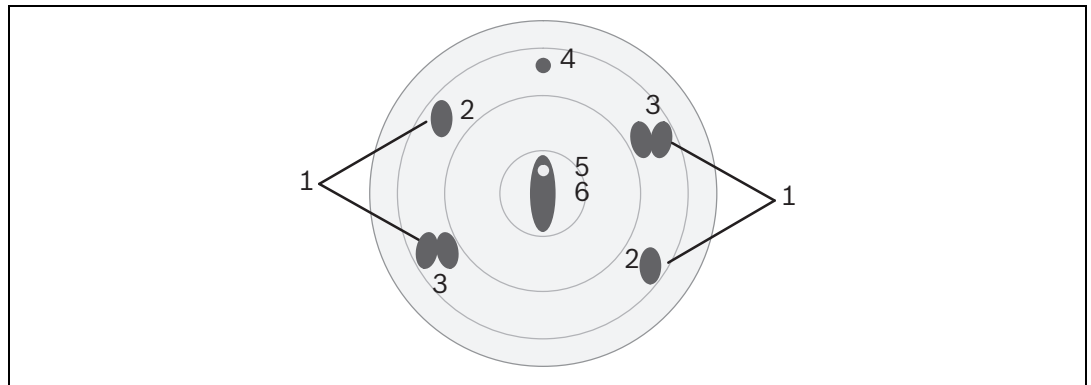
1.3 Configuration of the Detector

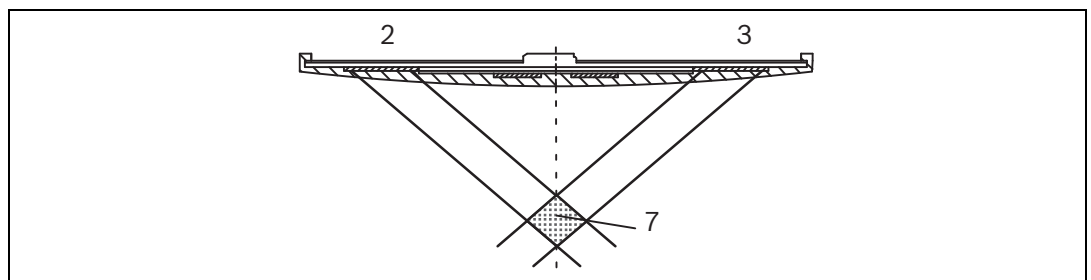**Figure 1.3** Detector front panel with sensors

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 (see *Figure 1.3* **(1)**) operates according to the scattered light principle. The LEDs (see *Figure 1.3* **(3)**) transmit light at a defined angle into the measuring area (see *Figure 1.4* **(7)**). In case of fire, the light is scattered by the smoke particles and strikes the photo diodes (see *Figure 1.3* **(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: glare test DIN 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 (see *Figure 1.3* **(4)**, only FCP-OC 500(-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.

Pollution sensor

The contamination level of the detector surface is measured and evaluated continuously by the pollution sensor (see *Figure 1.3* **(6)**).

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 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	green, double flash every 8 to 12 seconds
Test mode	green, flashes once every second

In test mode, the contamination level can be read via the number of the red LED flashes (see *Section 4.4 Reading the Contamination Level, page 25*).

2   Planning Notes

2.1   General Notes

NOTICE!

(i) The 500 Series Detectors are approved for indoor use only!

The detectors must be installed exclusively in the FCA-500-EU/FCA-500-E-EU 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 FCP-OC 500, like the FCP-O 500, is planned according to the guidelines for optical detectors (see also EN 54 and VDS 2095).
– A hemispherical space (see *Figure 2.1* **(1)**) with a radius of 50 cm must remain free below the detector (see *Figure 2.1* **(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.
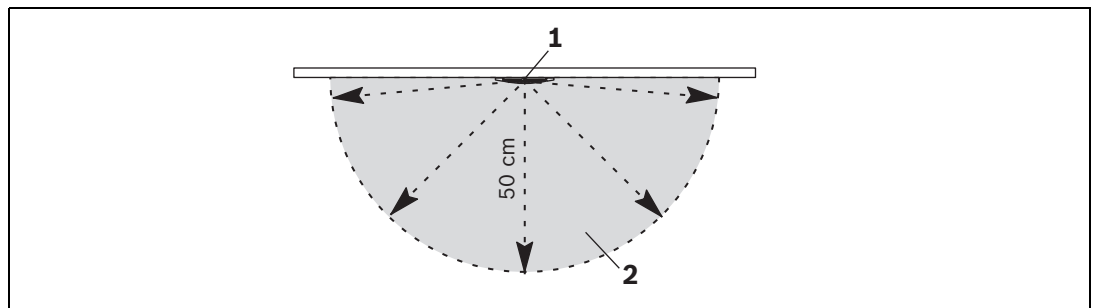
Figure 2.1 Radius

– 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 500 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 red marking. For mounting a detector in a false ceiling panel you can use the additional, softer spring in the package. In this use case, the detector must not be subjected to strong vibrations (> 350 m/s).
– Maximum permitted air speed: 20 m/s.

3   Installation

> ⓘ **NOTICE!**
> The 500 Series Detectors may only be installed with an FCA-500-EU or FCA-500-E-EU 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 red marking. For mounting a detector in a false ceiling panel you can use the additional, softer spring in the package.In this use case, the detector must not be subjected to strong vibrations (> 350 m/s).

3.1   Ceiling Mount Back Box

Figure 3.1   Ceiling mount back box

The ceiling mount back box (see *Figure 3.1*) 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.
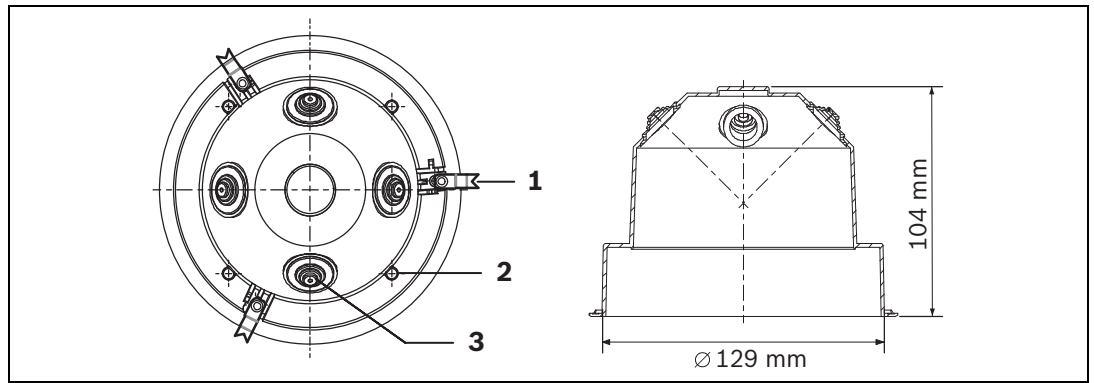> Above the false ceiling, a free height of at least 11 cm is required.

1.   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		

2. Pull the cable through one of the cable bushings (see *Figure 3.2* **(3)**). A cable tie around the cable sheath will secure the cable against being pulled out accidentally.
3. Insert the ceiling mount back box in the false ceiling from below.
4. A triangular marking (see *Figure 3.3* Pos. **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.
5. Tighten the brackets (see *Figure 3.2* **(1)**).
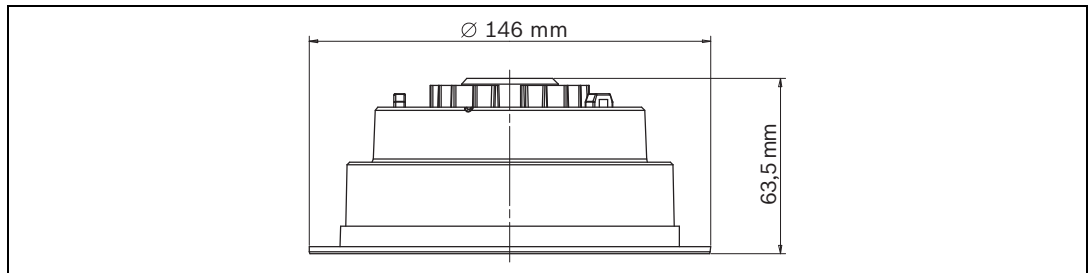
NOTICE!
It is recommended that for the usual, soft false ceiling panels, you do not use a cordless screwdriver.
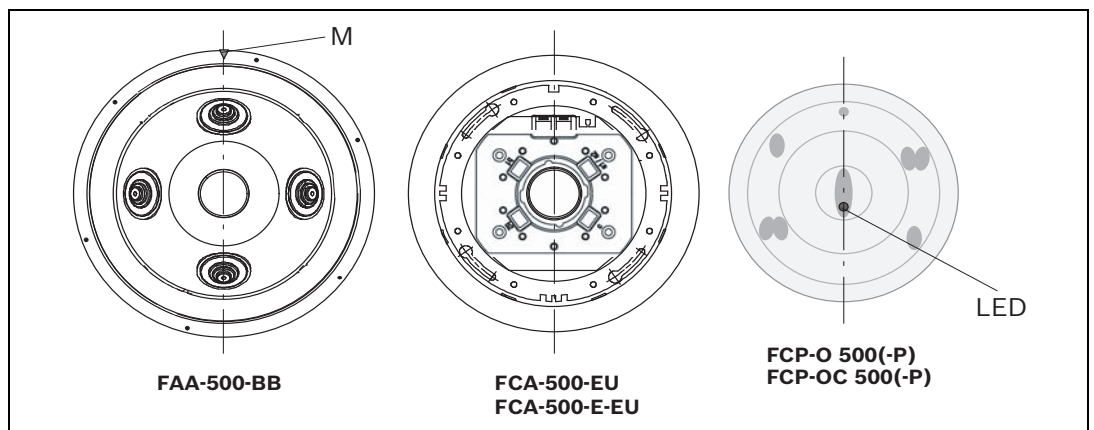
Figure 3.3   Alignment of ceiling mount back box, base and detector

3.2   Detector Base/Detector Base with EOL Resistor

Figure 3.4   Side view of base

The base housings (see *Figure 3.4*) 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.

End-of-line resistor

As the last base on the stub line you always have to place an FCA-500-E-EU detector base. Inside the base, a suitable EOL resistor has to be mounted between the two screw clamps (see *Figure 3.5*, position EOL).

NOTICE!

FCA-500-E-EU detector bases with EOL resistor can only be used in the last position of a stub. If an FCA-500-E-EU detector base is placed in any other position, all following detectors of the stub will not operate.

Alarm resistor

By breaking off the printed circuit board tongue, the alarm contact resistance is changed from 0 Ω to 680 Ω (see *Figure 3.5*).

NOTICE!

For all Bosch fire panels, the alarm contact resistance has to be changed to 680 Ω.
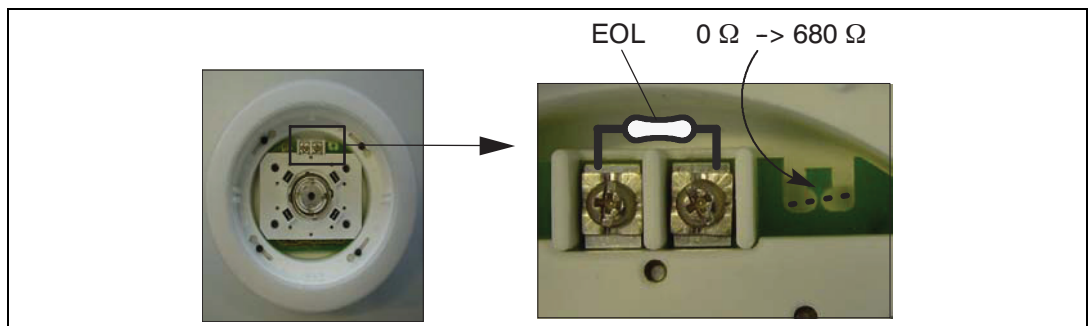
Figure 3.5   EOL resistor/alarm contact resistance

Connecting the base

Wire up the LSN base according to the labeling in the inner ring (see *Figure 3.6* **(3)**).
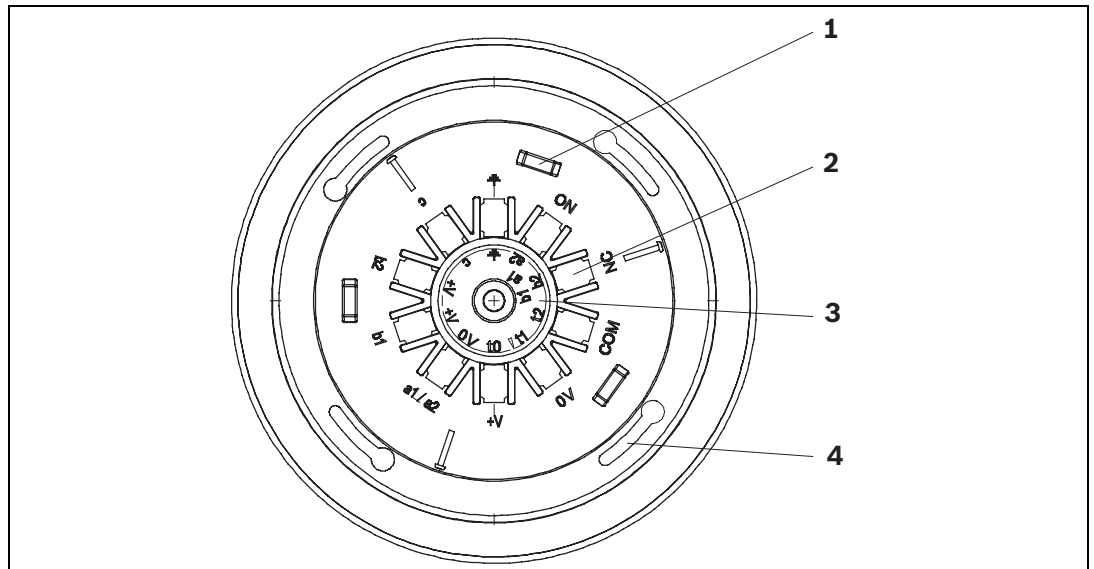
Figure 3.6   Plan view base

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

Connection	Terminal	Wire	
		4-Wire (*Figure 3.7*)	**6-Wire(*Figure 3.8*)**
Voltage + (2 places)*	+V	red (rd)	
Voltage -	0V	black (bk)	
Trouble relay	t_0 (not connected)	not connected	[green (gn)]
	t_1 (C)	connect to b1/b2	brown (bn)
	t_2 (NC)	yellow (ye)	brown (bn)
Alarm relay	b1 | b2 (NO)	yellow (ye)	
	a1/a2 (C)	white (wh)	
Shielding	⏚	[blue (bu)]	
Indicator output	c		
* Terminals for looping through the power supply.			
** The wire can be re-feeded from the trouble relay by connecting it to terminal t_0.			

NOTICE!

With a four-wire connection (see *Figure 3.7*), an alarm of any of the following detectors in a stub will not be recognized in case of a fault.

With a six-wire connection (see *Figure 3.8*), all following detectors of a stub will continue to operate even in case of a fault.
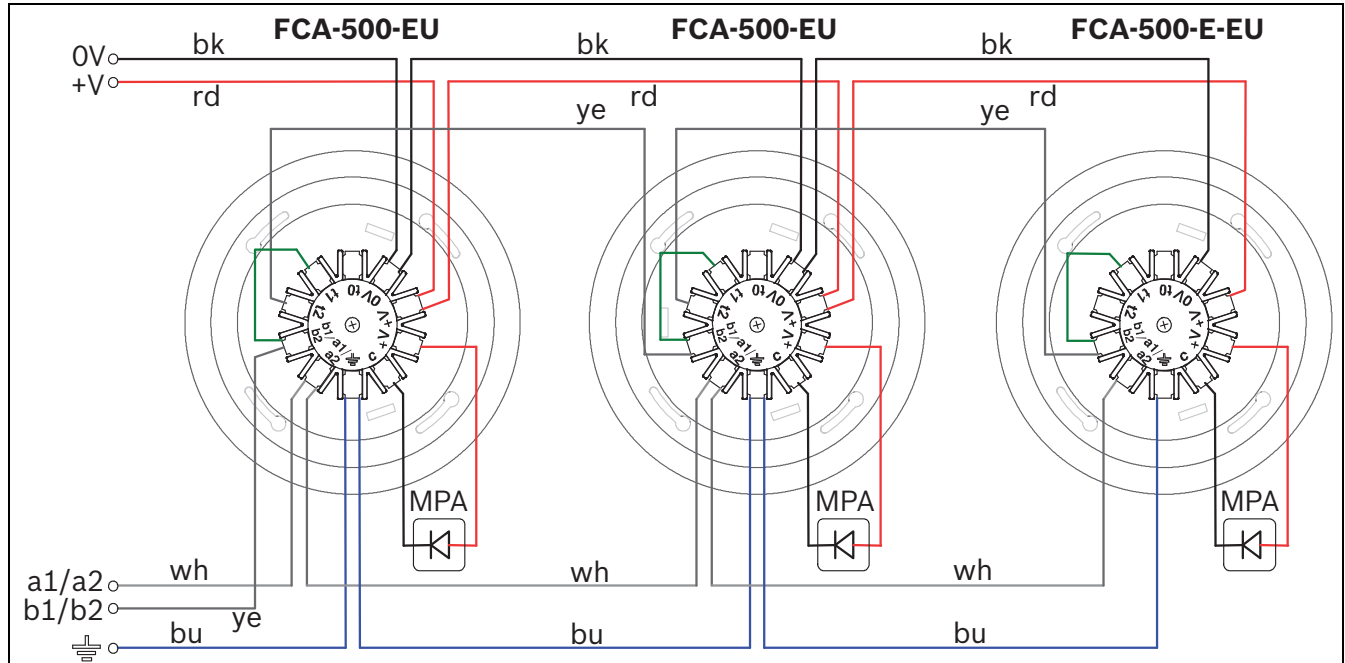
Figure 3.7   Connection of the detector base with 4 wires

Position	Description
MPA	External detector alarm display (optional)
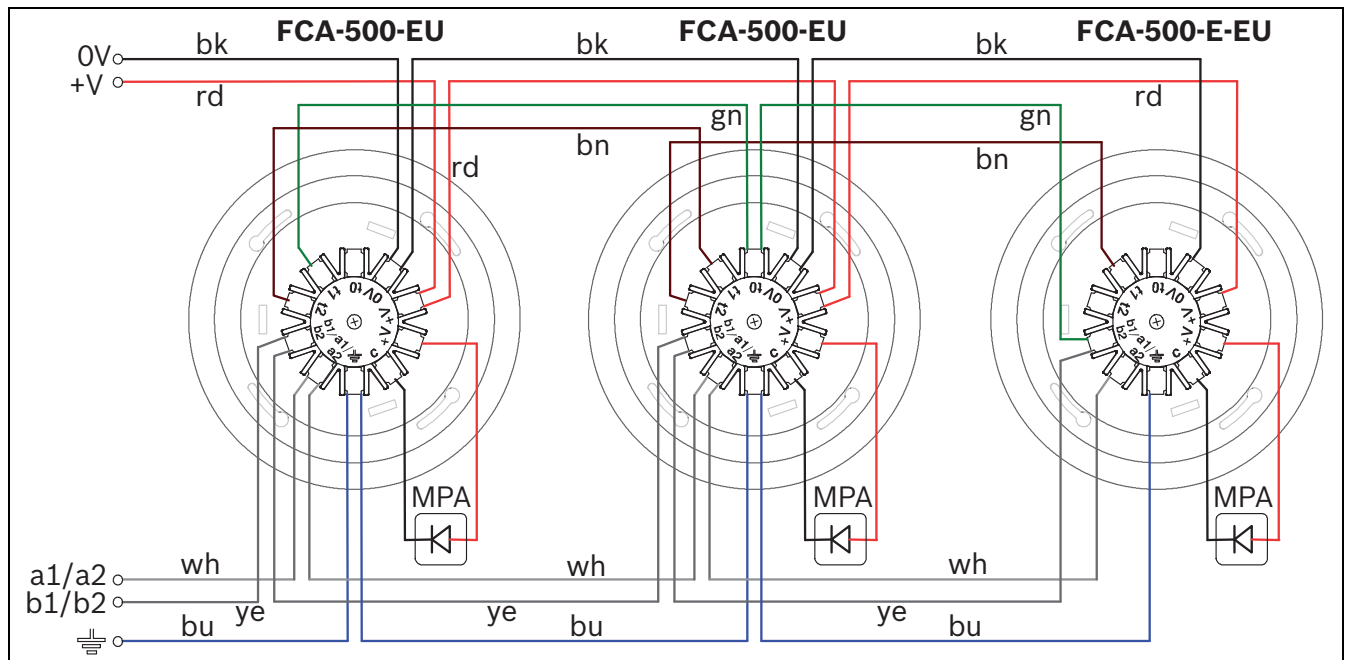
Figure 3.8   Connection of the detector base with 6 wires

Position	Description
MPA	External detector alarm display (optional)

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.
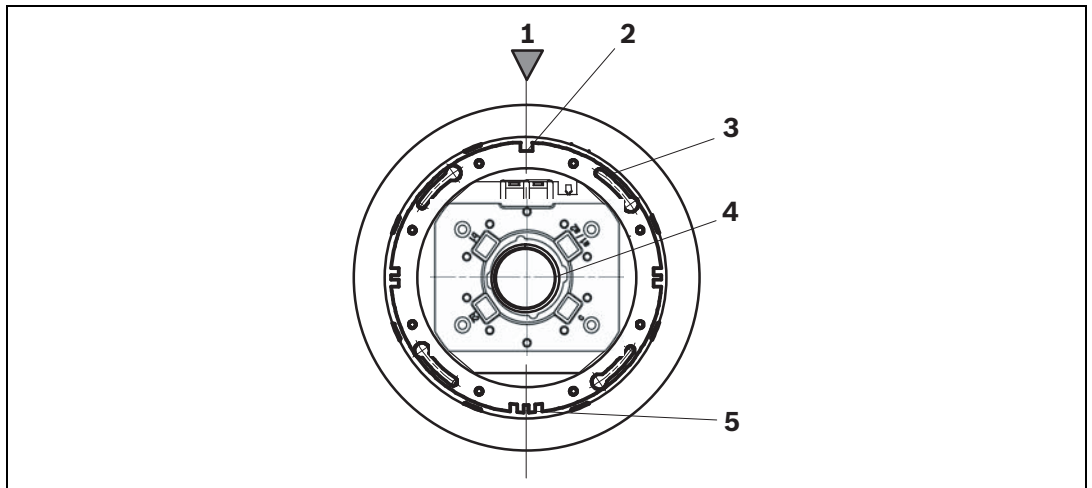
Figure 3.9   Placing the base in the ceiling mount back box

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 (see *Figure 3.9* **(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 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.
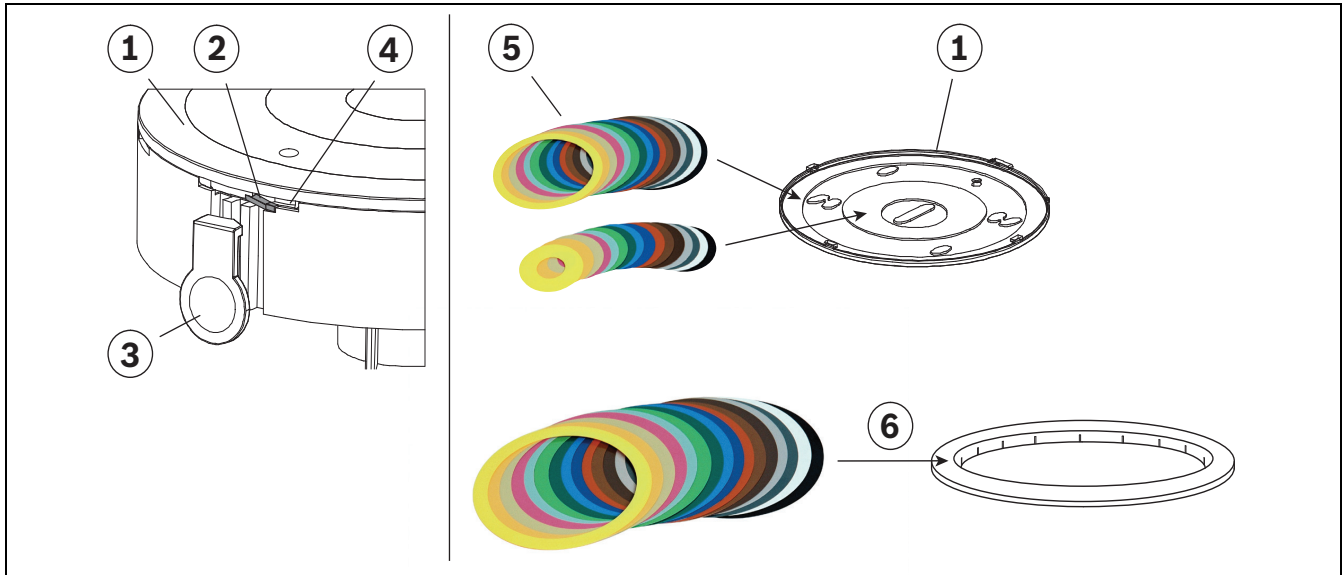
Inserting the color rings

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 3.10 Inserting the color 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
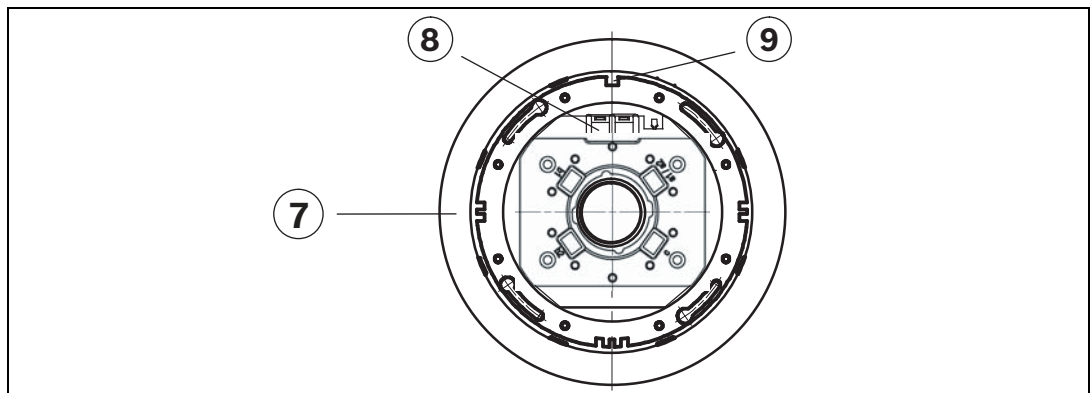
Figure 3.11 Inserting the detector and trim ring

> **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. Otherwise, the detector will not function.

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.

3.4   Built-in Housing for Concrete Ceilings
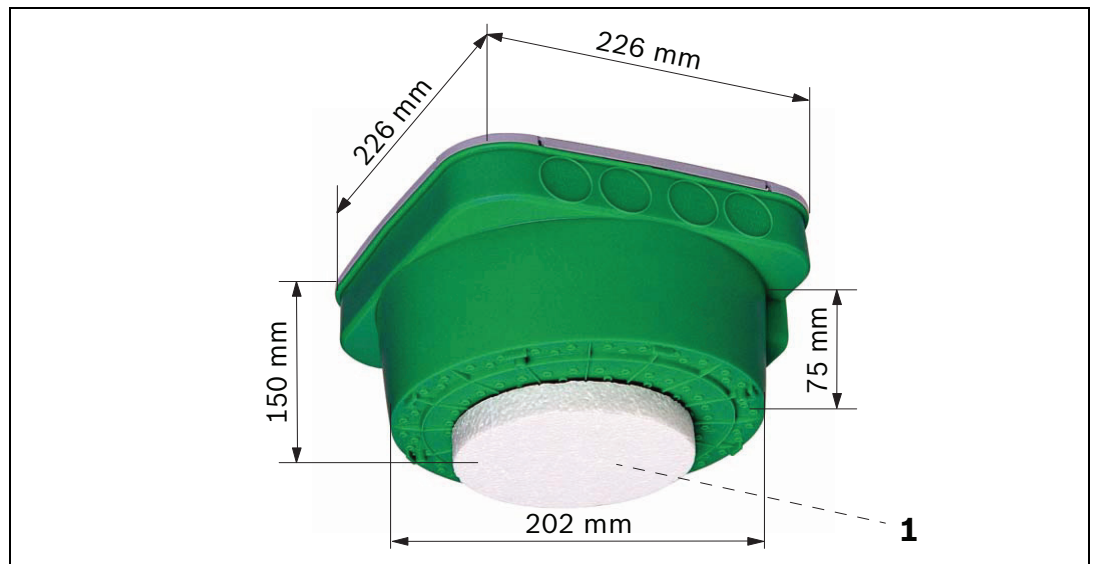
Figure 3.12   FAA-500-CB built-in housing

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.

Pipe or cable inlets at the FAA-500-CB Built-in Housing within the wall areas are made with an universal cutting tool. After removing the form-boards, the front part (see *Figure 3.12* **(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.

3.5   Surface Mount Back Box
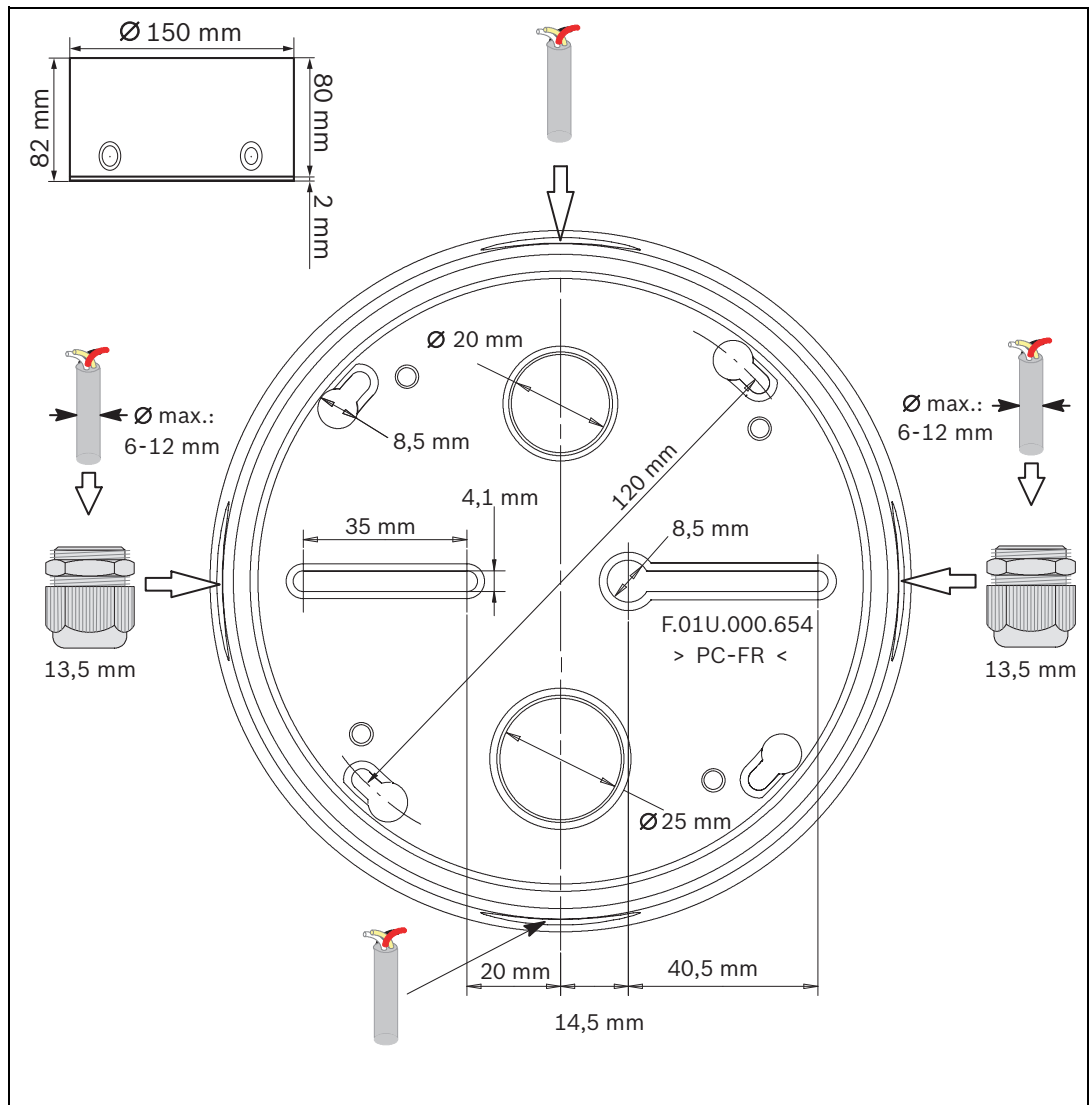
Figure 3.13   FAA-500-SB-H Surface Mount Back Box

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**
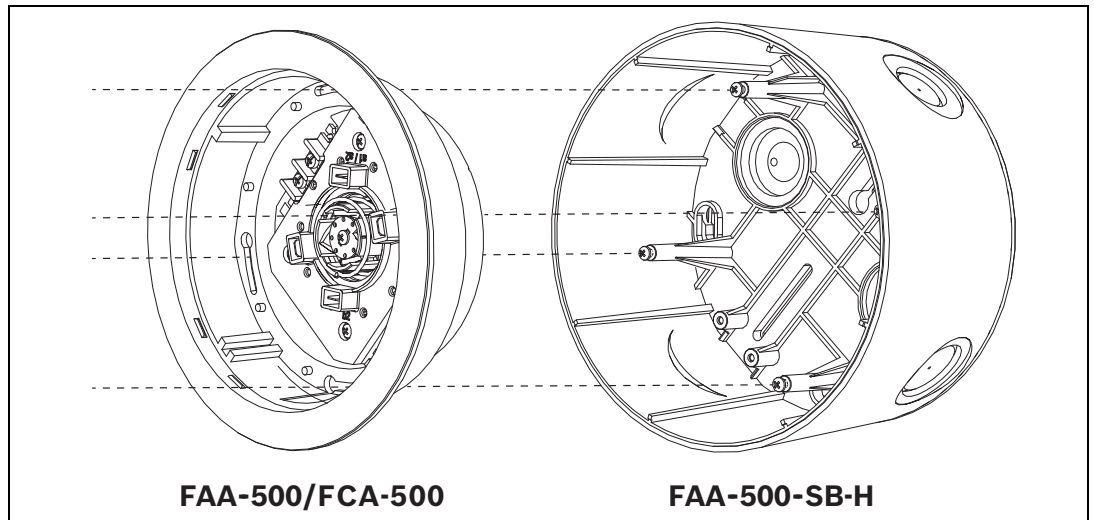
Figure 3.14   Fastening points for mounting

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

3.6   External Detector Alarm Displays

If the detector is not directly visible or was mounted in rooms that are inaccessible, an external detector alarm display is used in the corridors or in the access routes to the corresponding section of the building or rooms.

The red alarm indication corresponds to DIN 14 623.

3.6.1   Mounting Notes for the Remote Indicator FAA-420-RI

NOTICE!

The FAA-420-RI remote indicator must be mounted so that the flat side (see *Figure 3.15* **(2)**) shows towards the observer's line of sight.
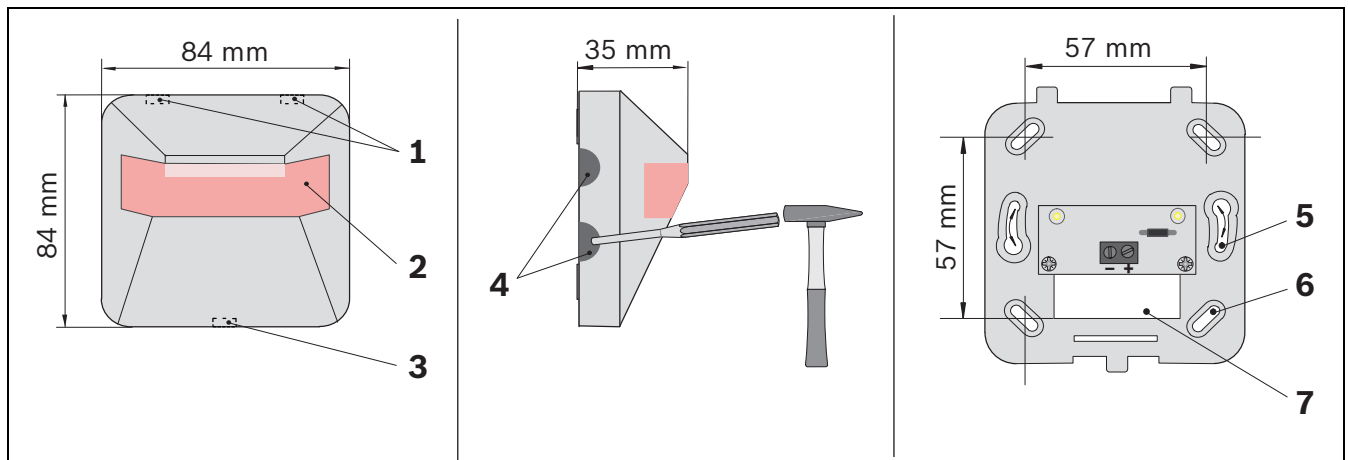
Figure 3.15   FAA-420-RI dimensions and mounting

Position	Description	Position	Description
1	Hooks	5	Slots for securing the base with two screws
2	Flat side of the red alarm indication	6	Slots for securing the base with four screws

Position	Description	Position	Description
3	Snap-fit hook	7	Cable opening
4	Pre-punched cable feeds		

1. Before assembly, remove the cap from the base plate: Unlock the snap-fit hook (see *Figure 3.15* **(3)**) with a flat object (e.g. screwdriver), press in and lift the cap carefully.
2. Mount the FAA-420-RI directly on the ceiling or wall. Secure the base plate with two (see *Figure 3.15*, **(5)**) or four **(6)** screws on an even, dry foundation.
3. For surface-mounted cable insertion, break out the pre-punched cable feeds (see *Figure 3.15* **(4)**) on any side of the housing. For flush-mounted cable insertion, the cable is fed in through the opening (see *Figure 3.15* **(7)**) beneath the connection board.
4. Connect FAA-420-RI via two terminals (see *Figure 3.16*).

C   b1/+V
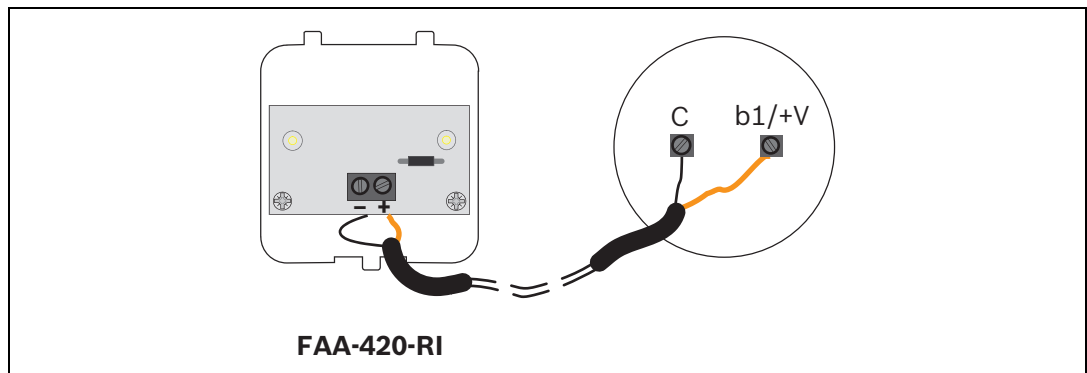
FAA-420-RI

Figure 3.16 FAA-420-RI Connection

5. Place the housing on the base place so that the two hooks (see *Figure 3.15* **(1)**) are inserted into the two slits. Press the cap lightly onto the base plate until the snap-fit hooks **(3)** engage.

The technical data can be found in *Section 5.4 External Detector Alarm Displays, page 29*.

3.6.2 Mounting Notes for the External Detector Alarm Display MPA

NOTICE!
According to VdS guidelines, the external detector alarm display must be mounted so that the flat side of the prism (see *Figure 3.17* **(2)**) shows towards the observer's line of sight.
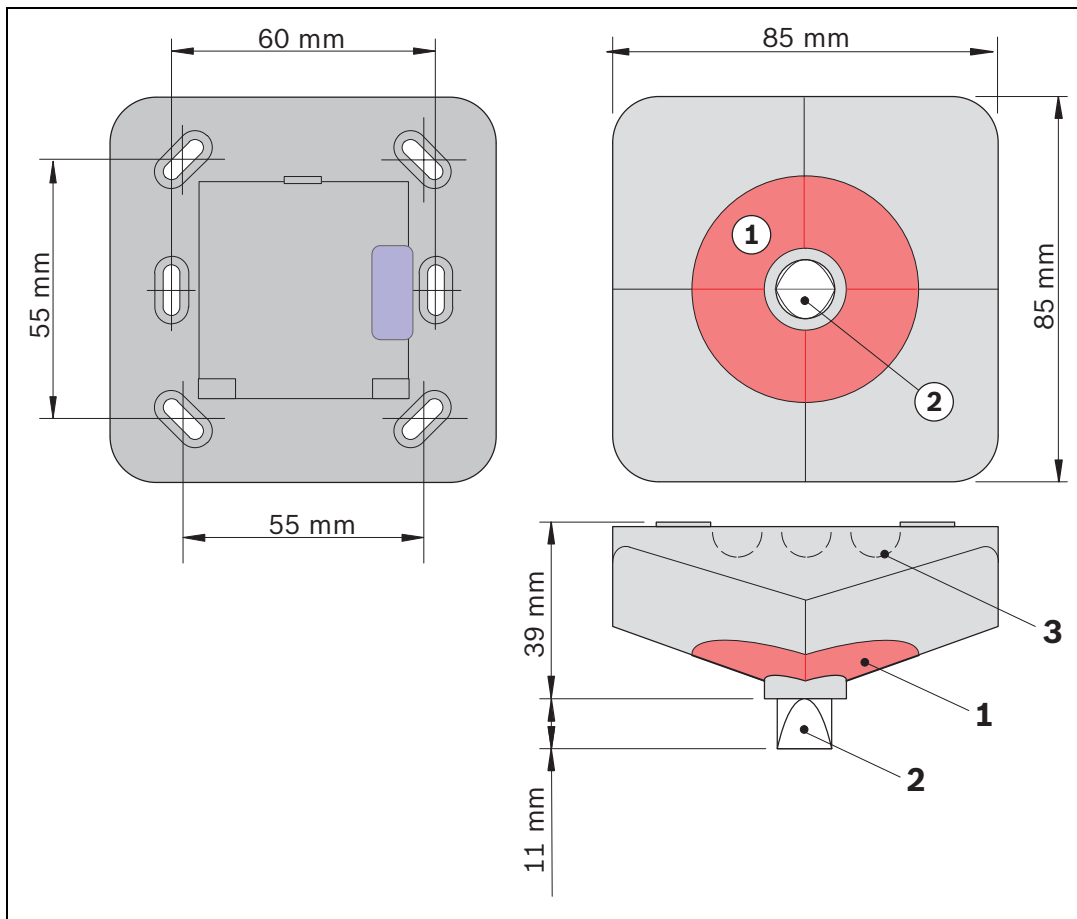
Figure 3.17   External detector alarm display MPA, dimensions

Position	Description	Position	Description
1	Red zone	3	Cable entry points
2	Prism		

Mounts directly on the ceiling or wall.

For surface mounted cable entry, break out the prepared cable entry points (see *Figure 3.17*. **(3)**) on the housing. For flush mounted cable entry, cable entry is through the opening below the connection board.

Connecting the External Detector Alarm Display MPA

The external detector alarm display is connected using 4 Wago terminals (see *Figure 3.18*).
–   Connecting: insert the stripped cable end (no braided wire) into the terminal.
–   Disconnecting: pull out the wire while turning it to and fro.

Up to 4 detectors can be connected to each external detector alarm display.

Three inputs (terminals 2 - 4) allow adjustment to the various line networks.

Making the connection depending on the used line technology

Line technology	Fire panels	Terminals
GLT	BZ 1060	1 + 2
GLT	UEZ 1000, UGM 2020, FP 102, 104, 106	1 + 3
LSN	BZ 500 LSN, UEZ 1000, UEZ 2000, UGM 2020, FPA-5000, FPA 1200	1 + 4

Terminal assignment
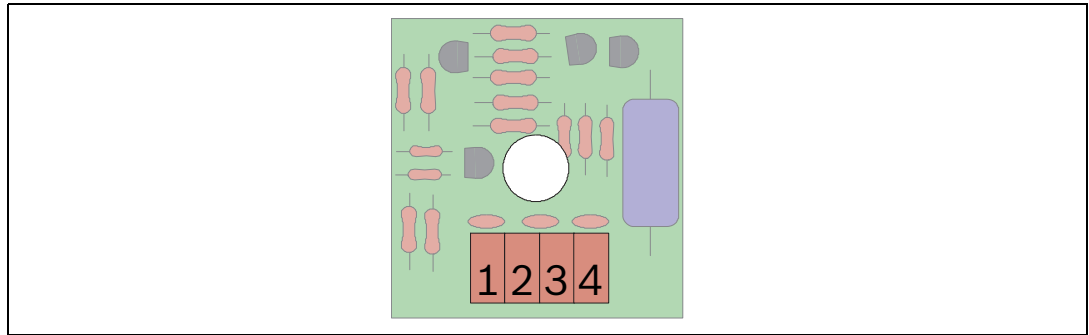
Figure 3.18   Terminal assignment MPA

Terminal	Assignment
1	Ground
2	Flashing input (LED flashes)
3	Static input (LED lights up)
4	Static input (LED lights up)
Only connect to Terminal 4 via a series resistor (integrated in the case of BOSCH detectors); otherwise, the LED could be destroyed.	

The technical data can be found in *Section 5.4 External Detector Alarm Displays, page 29*.

4 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 500 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 Sicherheitssysteme GmbH 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 *Section 4.3 Inspection Procedure for FCP-O 500*)	X	-
Combined test with detector test device and CO testing gas (see *Section 4.2 Inspection Procedure for FCP-OC 500*)	-	X

> **NOTICE!**
> Multisensor detectors with C sensors must be exchanged every 4 - 6 years.

FCP-OC 500

Due to the life expectancy of the gas sensor, the FCP-OC 500 detector switches off the C sensors after approx. 4 - 6 years of operation. The detector will continue to function as an O detector.

The detector should then be exchanged immediately in order to be able to keep using the higher reliability of detection 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 revision mode.

4.1 General Notes for Detector Testing

The FCP-OC 500 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, FCP-500 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 occurs by holding the FAA-500-TTL test adapter with magnet closely to the reed switch. The green LED flashes once a second as long as the detector remains in test mode.

The detector operates normally after a maximum of one minute so that a new test mode can be triggered.

(i)

NOTICE!

For the detector test, you need:
- Detector test device for optical fire detector (product ID: 4.998.112.071)
- FAA-500-TTL test adapter with magnet (product ID: F.01U.508.725)

For OC detector, in addition:
- CO testing gas for detector with CO sensor (product ID: 4.998.142.221)

(i)

NOTICE!

Make sure that the alarm cannot be passed on to higher-level systems. Programmed activations of the fire panel are retained and will be executed.

If the fire panel is in revision mode, the alarm will be reset automatically after a particular time. Otherwise, the alarm has to be reset manually on the fire panel.

4.2 Inspection Procedure for FCP-OC 500

Figure 4.1 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.
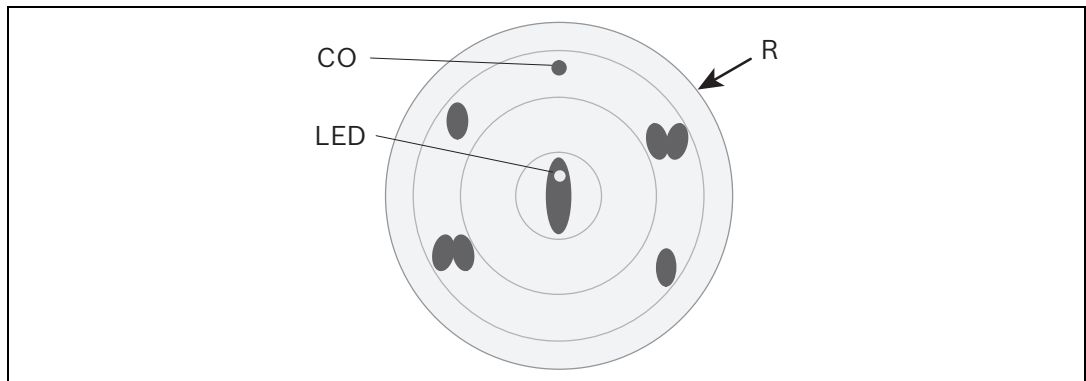
Figure 4.1 Position of reed switch

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. Spray the CO testing gas for approximately 1 second.
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 seconds.

5. 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).

6. The detector triggers the alarm and the red alarm LED flashes.

4.3 Inspection Procedure for FCP-O 500

Figure 4.1 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.
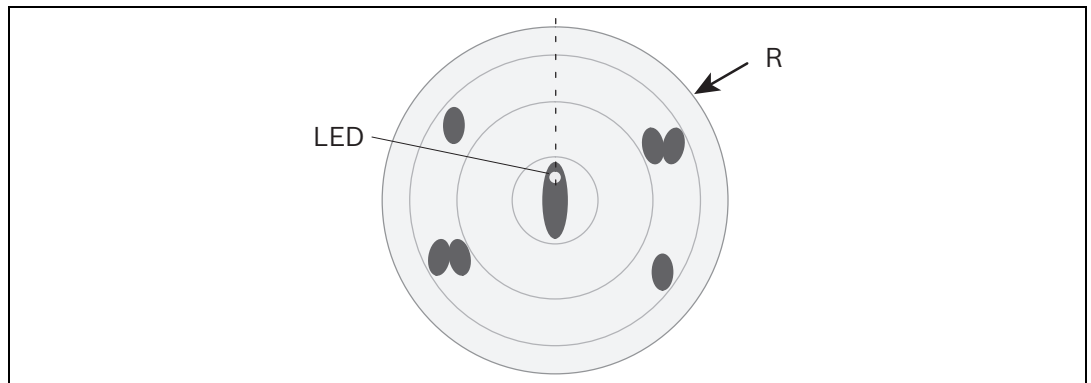
Figure 4.2 Position of reed switch

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 seconds 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. 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. By covering the scattered light areas, both optical sensors are triggered simultaneously. Thus, no O testing gas is required.

3. The detector triggers the alarm and the red alarm LED flashes.

4.4 Reading the Contamination Level

In test mode, the contamination level can be read via the number of the red LED flashes.
1. Activate the reed switch with the magnet of the test tool.
2. The LED of the detector flashes green once a second as soon as the reed switch has been triggered.
3. Leave the magnet on the test tool by the reed switch for 5 seconds. To do this, just count 5 flashes of the green LED.
4. Remove the test tool. Count the flashes of the red LED. Refer to the table for the detector's contamination level.

Contamination Level - Red LED Display	
Number of Flashes	**Detector's State**
1 to 3	Operating normally with little or no dirt contamination
4 to 6	Progressively more contamination => clean detector immediately
7 to 10	Trouble condition, very dirty => clean and check detector immediately

4.5 Electronic Function Test (Optional)

> **NOTICE!**
> Make sure that the alarm cannot be passed on to higher-level systems. Programmed activations of the fire panel are retained and will be executed.

1. Trigger the reed switch as described in *Section 4.2 Inspection Procedure for FCP-OC 500* and *Section 4.3 Inspection Procedure for FCP-O 500*.
   As soon as the reed switch has been triggered, the green LED flashes once a second.
2. After triggering, leave the magnet on the reed switch for at least 10 seconds. To do this, just count 10 flashes of the LED.
   After 10 seconds, the detector triggers a test alarm. The LED lights up red.

4.6 Repair

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

4.7 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.

4.8 Additional Documentation

The current information for each product, as well as the installation instructions supplied with the device, are available for download as a PDF file via: www.boschsecurity.com\emea\fire.

5 Technical Data

5.1 Detector and Trim Ring

Detector type	FCP-OC 500/FCP-OC 500-P	FCP-O 500/FCP-O 500-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
Individual display	Two-color LED: red/green	
Operating voltage	8,5 to 33 V DC	
Current consumption		
– Standby	with FCA-500-EU: 3 mA with FCA-500-E-EU: 24 mA	
– Alarm	47 mA	
– Malfunction	with FCA-500-EU: 52 mA with FCA-500-E-EU: 58 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)	
Housing material	Polycarbonate	
Color of detector housing	Signal white (RAL 9003)	

Detector type	FCP-OC 500/FCP-OC 500-P	FCP-O 500/FCP-O 500-P
Color of detector front panel:		
– White variant	Signal white, matt	
– 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	

5.2   Detector Base

Base type	FCA-500-EU	FCA-500-E-EU
Special note	-	Detector base for the last position of a stub, with screw clamps for EOL resistor
Connections	Screw terminals for: – Power supply (0V, +V) – Trouble relay C/NC (t$_1$, t$_2$) – Alarm relay NO/C (b1 | b2, a1/a2) – Shielding – C-point	Screw terminals for: – Power supply (0V, +V) – Trouble relay C/NC (t$_1$, t$_2$) – Alarm relay NO/C (b1 | b2, a1/a2) – Shielding – C-point
Alarm resistor	680 Ω or 0 Ω (UL application)	
Fault relay output	NC/C	
Indicator output	Relay connects 0 V over 1,5 kΩ	
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

5.3   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
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/green
Dimensions (Ø x H)	226 x 226 x 150 mm
Weight	Approx. 345 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

5.4 External Detector Alarm Displays

FAA-420-RI

Operating voltage	5 to 30 V DC
Maximum current consumption	20 mA
Display medium	2 LEDs
Permissible wire gauge	0.6 to 2 mm
Dimensions	84 x 84 x 35 mm
Weight	45 g
Protection class as per IEC 60529	IP 40

MPA

Operating voltage		9 V DC to 30 V DC
Current consumption for display	Terminal 2	Approx. 2 mA
	Terminal 3	Limited to approximately 13 mA
	Terminal 4	Limit to 20 mA maximum*
Display medium		1 LED via a light guide
Permissible wire gauge		0.6 to 0.8 mm
Dimensions		85 x 85 x 50 mm
Weight		65 g
Protection class as per IEC 60529		IP 40
* Non-observance may cause malfunction and damage the LED. In case of BOSCH detectors, limitation occurs via internal resistor.		

A   Appendix

A.1   Abbreviations

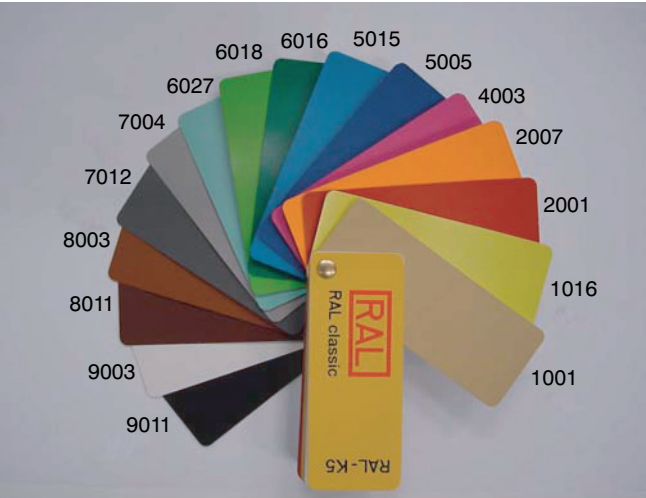|	
a.P.	auf Putz (surface-mounted)
ABS	AcrylonitrileButadieneStyrene
DIBt	Deutsches Institut für Bautechnik (German Institute for Building Technology)
DIN	Deutsches Institut für Normung e.V. (German Institute for Standardization)
EN	Europäische Norm (European standard)
FAA	Fire Analog Accessory
FACP	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	Local 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)

A.2   Order Overview

A.2.1   Detector and Trim Ring

Description	Product ID
FCP-O 500 Conventional Optical Fire Detector, white	F.01U.510.649
FCP-OC 500 Conventional Multisensor Fire Detector, optical/chemical, white	F.01U.510.653
FCP-O 500-P Conventional Optical Fire Detector, transparent with color toning inserts	F.01U.510.654
FCP-OC 500-P Conventional Multisensor Fire Detector, optical/chemical, transparent with color toning inserts	F.01U.510.656

Description	Product ID
FAA-500-TR-W Trim Ring, White, for the detectors FCP-O 500 and FCP-OC 500	4.998.151.295
FAA-500-TR-P Trim Ring, Transparent, with color toning inserts for FCP-O 500-P and FCP-OC 500-P detectors	4.998.151.296

Color toning inserts for FCP-O 500-P, FCP-OC 500-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	

A.2.2 Detector Bases/Accessories

Description	DU*	Product ID
FCA-500-EU Conventional Detector Base	PE	4.998.510.647
FCA-500-E-EU Conventional Detector Base with EOL resistor	PE	4.998.510.648

A.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

A.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

Description	DU*	Product ID
CO Testing Gas (spray can) for detectors with CO sensors (1 PU = 12 pieces) for use in test device for optical fire detectors	PU	4.998.142.221
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
MPA External Detector Alarm Display according to DIN 14 623 (with VdS approval)	PE	2.799.330.669
FAA-420-RI Remote Indicator according to DIN 14 623	PE	F.01U.522.590

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