500 Series Photoelectric Detectors

FCP-500 | FCP-500-P | FCP-500-C | FCP-500-C-P

BOSCH

en Installation Guide

1. Specifications

Table 1: Models		
Type	Description	Material No.
FCP-500-C	Photoelectric Detector with Carbon Monoxide Detection, Color White	4.998.150.703
FCP-500-C-P	Photoelectric Detector with Carbon Monoxide Detection, Transparent with Color Inserts	4.998.150.705
FCP-500	Photoelectric Detector, Color White	4.998.150.702
FCP-500-P	Photoelectric Detector, Transparent with Color Inserts	4.998.150.704

The CO sensor has not been evaluated to the requirements of UL 2075 or for its ability to detect a fire.
The FCP-500-C and FCP-500-C-P detect CO as a component of a fire.
Do not use the FCP-500-C and FCP-500-C-P as CO detectors.

Table 2: Options (included)		
Type	Description	Material No.
FAA-500-BB-UL	Ceiling Mount Back Box for US	F.01U.510.767
FCA-500	Four-Wire Base (six conductors)	4.998.151.300
FCA-500-E	Four-Wire EOL Base (six conductors)	4.998.151.301
FAA-500-TR-W	Trim Ring, White	4.998.151.295
FAA-500-TR-P	Trim Ring, Transparent with Color Inserts	4.998.151.296

Table 3: Options (optional)		
Type	Description	Material No.
DRA-5	Remote LED Annunciator	-
FAA-500-TTL	Test Adapter with Magnet	F.01U.508.725
FAA-500-RTL	Removal Tool	F.01U.508.720

Table 4: Technical Data		
Operating Voltage	9.7 V DC to 30 V DC	
Current Consumption	Standby	Alarm/Trouble
- FCA-500 / FCA-500 with DRA-5	3 mA / 3 mA	47 mA / 52 mA
- FCA-500-E / FCA-500-E with DRA-5	24 mA / 24 mA	47 mA / 58 mA
Alarm Output	Alarm resistance 680 Ω or 0 Ω (US only)	
Remote LED Output	Maximum 20 mA	
Rating of Trouble/Alarm Relay	1 A @ 30 V DC	
Reset Time	The detector resets if power is interrupted for at least 2 sec.	
Max. Start-up Time	22 sec	
Sensitivity	1.3 ...2.9 %/ft (4.3 ... 9.5 %/m)	
Mounting Locations	Refer to NFPA-72 guidelines.	
Maximum Mounting Height	Refer to NFPA-72 guidelines.	
Minimum Mounting Height	9.0 ft (2,7 m)	

Table 4: Technical Data (continued)	
Maximum Thickness of False Ceiling	1.25 in. (32 mm), flush mount applications only
Minimum Clearance for False Ceiling	6 in. (15.2 cm)
Required Hole	5-1/16 in., tolerance -1/16 in. to + 3/16 in. (130 mm, tolerance -1 mm to +5 mm)
Minimum Distance from Lamps	1.6 ft (0.5 m)
Maximum Airflow	300 ft/min (1.5 m/s)
Operating Temperature	+32 °F to +100 °F (0 °C to +38 °C)
Humidity	< 95%, non-condensing
Protection Class as per IEC 60529	
- FCP-500-C and FCP-500-C-P	IP 33
- FCP-500 and FCP-500-P	IP 53
Dimensions	
- Detector only	4.5 in. x 2.2 in. (113 mm x 55 mm)
- Detector with Trim Ring	5.9 in. x 2.2 in. (150 mm x 55 mm)
- Detector with Trim Ring and Base	5.9 in. x 2.75 in. (150 mm x 70 mm) with base
Compliance	UL 268

2. Installation Considerations

For proper installation, read and understand NFPA-72, The National Fire Alarm Code before installation.

Caution:

- Do not remove the plastic film from the detector head until construction of the installation area is finished.
- Protect the detector sensor windows from paint or contaminates. Remove the detector head during remodelling and store it in a clean dry location.

☞ If you do not follow these cautions, the detector might not operate.

Detector Location and Spacing:

- BOSCH recommends spacing the sensors in compliance with NFPA-72. In low air flow applications with smooth ceilings, space sensors with a maximum distance of 30 ft. For specific information regarding sensor spacing, placement and special application refer to NFPA-72.
- Not suitable for outdoor use.
- Do not install in areas where the detector is pointed at direct or indirect sunlight.
- Do not mount detector in a cone of light from a lamp.
- Maintain a hemispherical radius of at least 19 in. (50 cm) around the detector (see Fig. 1.). Insure that this area in front and to the sides of the detector is kept clear of all obstructions (see Fig. 1.).

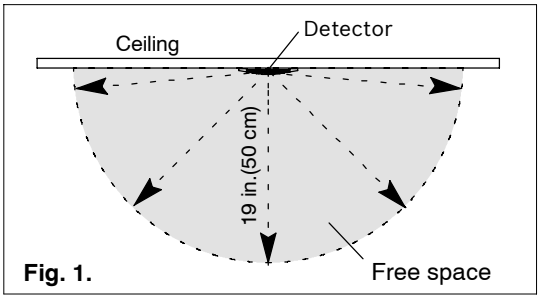

Fig. 1.

Further Considerations:

- Only use end-of-line (EOL) resistors supplied or specified by the control panel manufacturer.
- Smoke detectors are not to be used with detector guards unless the combination has been evaluated and found suitable for that purpose.
- This detector must be installed in compliance with the control panel system installation manual.
- Install, test and maintain this device according to this installation guide, NFPA-72, Local Codes and the Authority Having Jurisdiction (AHJ). Failure to follow these procedures may cause the device to not function properly. Bosch Security Systems is not responsible for any devices that are improperly installed, tested or maintained.

3. Installation

Dismantling Detector

1. Push on the center of the detector's front plate. The detector head springs out of the base.
2. Remove the detector head from the base.
3. Lift the trim ring by the edge to remove it from the base.
4. Loosen the four screws holding the base to the backbox.
5. Turn the base counter-clockwise until the screws line up with the large end of the slots. Remove the base from the back box.

Inserting Color Rings (FCP-500-C-P and FCP-500-P)

1. Select a color.
2. From the selected color, insert the largest color ring in the trim ring.
3. Remove the detector front plate:
   Insert the enclosed small opener tool (2) into the slot (3) above the snap-fit (1) and secure it with your thumb. Grasp the edges of the detector front plate, push gently, turn counter-clockwise, and lift.
4. From the selected color, insert the larger color ring in the outer ring, and the smaller color ring in the inner ring of the detector front plate (see Fig. 3.).
5. Replace the front plate cover. Ensure the tabs on the cover align with the grooves in the detector head. The cover will lie flat on the detector head.
6. Turn the cover clockwise to lock it into place.

   Note:

   If the cover aligns properly, all the sensor openings in the detector head are clearly exposed.

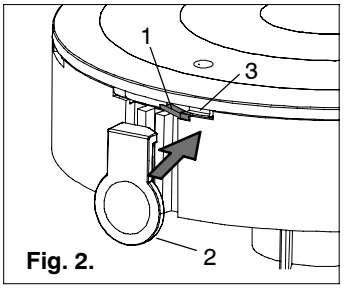

Fig. 2.

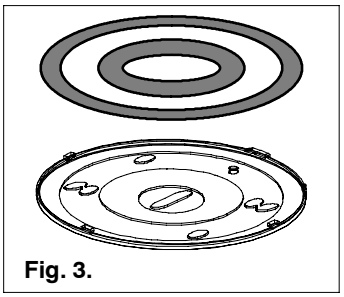
Fig. 3.

Ceiling Mount Back Box (FAA-500-BB-UL)

- For installation, refer to the FAA-500-BB-UL Installation Guide (P/N 601-F.01U.003.008).

Wiring the Base (FCA-500 and FCA-500-E)

In applications which require UL listed units, the power of all connections (detector power, trouble and alarm relay) must be taken from power limited supplies when the cable is carried through the grommets.

Please check with the local authorities to insure mounting without the conduit connector is allowed.

Note:

- Do not twist or loop the wires around the terminals. The wires for terminal connection must be cut, stripped, and inserted as individual ends.
- Use the cable holders on the base for strain relief for the wires.

An FCA-500-E Four-Wire EOL Base is required

- for single detector installations
- always as the last base for each stub line.

An EOL resistor can only be attached to the FCA-500-E Four-Wire EOL Base.

- **EOL resistor:** The last base on the stub line has to be a FCA-500-E. For this, place the EOL resistor between the two screw clamps (see Fig. 4.).
- **Alarm resistor:** If neccessary, change the alarm contact resistance from 0 Ω to 680 Ω by breaking off the printed circuit board tongue (see Fig. 4.).

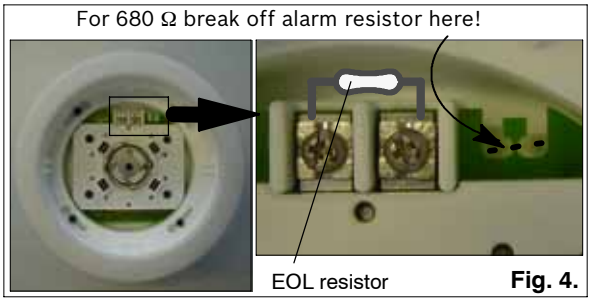

Fig. 4.

Table 5: Wiring Connections (Inner Ring for Conventional)		
Connection	Terminal	Wire
Alarm relay (normally open)	b1/b2	yellow
	a1/a2	white
Shielding	not used	-
Indicator output	c	white
Voltage +	+V	red
Voltage +	+V	red
Voltage -	0V	black
Trouble relay (normally closed)	t_0 (not connected)	
	t_1 (common) *	green
	t_2 (normally closed)	green
* Connect terminal b1/b2 of the last detector base with terminal t_1 of the first detector base of the stub (see blue wire in Fig. 7.).		

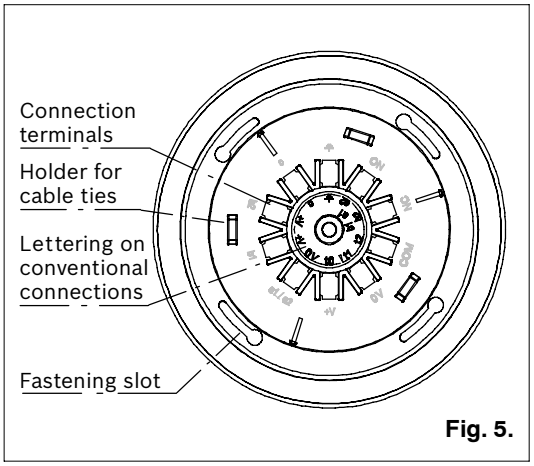

Fig. 5.

Single Detector Wiring

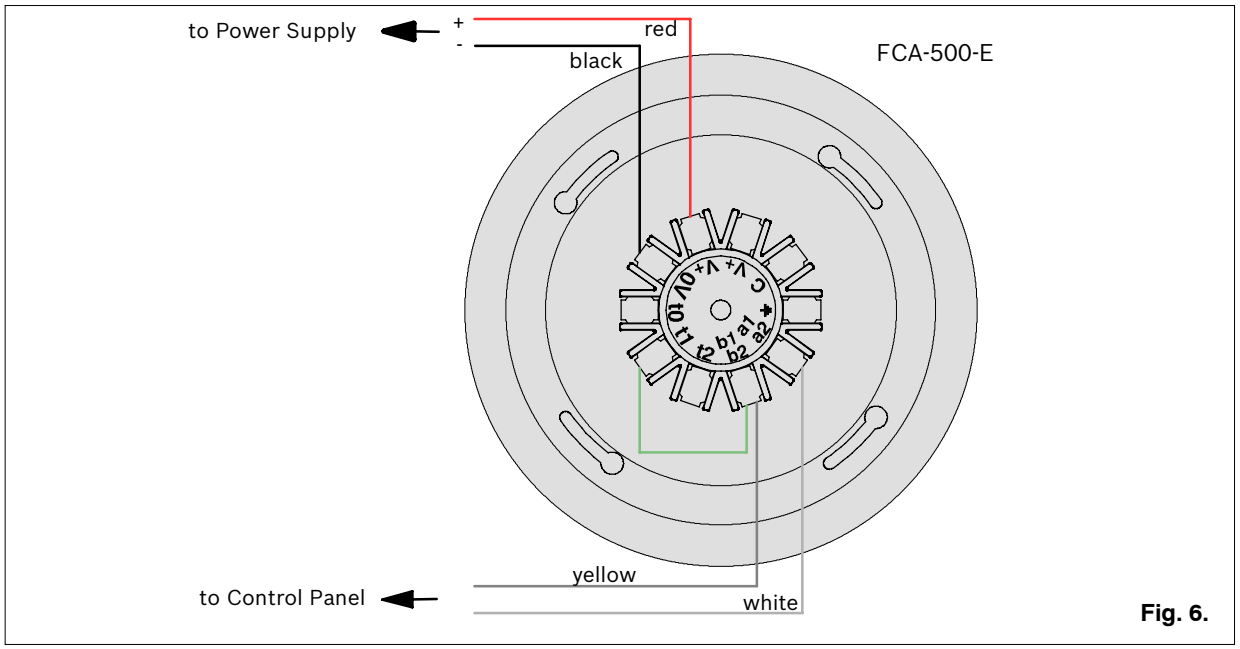

Fig. 6.

Multiple Detector Wiring

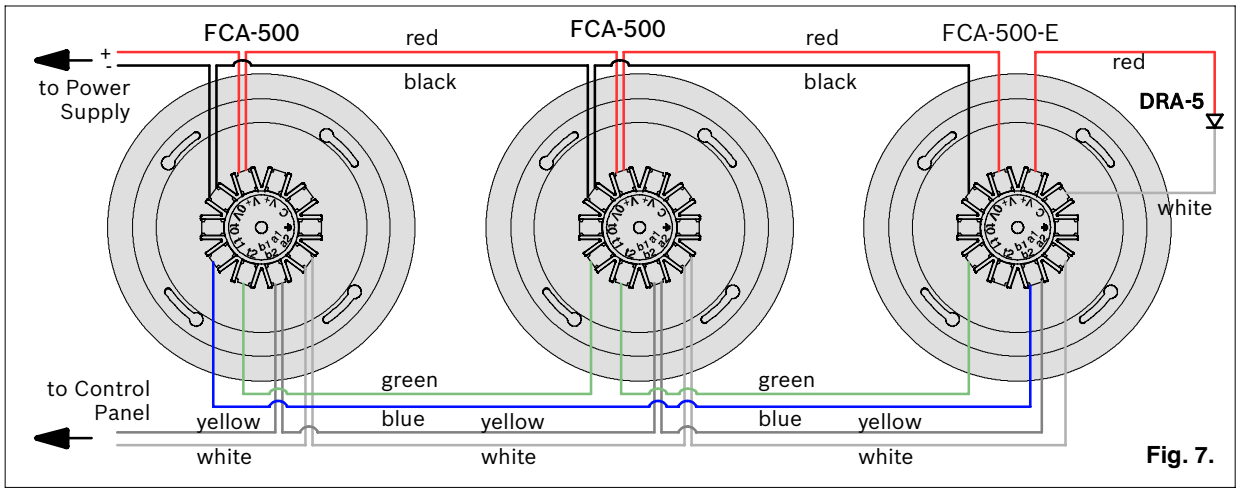

Fig. 7.

Mounting the Base (FCA-500 and FCA-500-E)

1. Insert the base in the back box so that it fits over the four screws.
2. Turn the base clockwise until it stops to lock it in place.
3. Repeat steps 1 and 2 if you install multiple detectors in a line.
4. Slightly turn each base until the mark on the base aligns with the other detectors' marks (see Fig. 8.).
5. Tighten the screws with the supplied wrench.

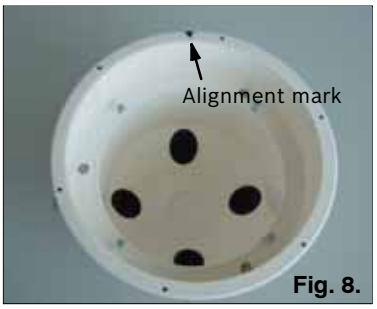

Fig. 8.

Inserting the Detector Head

1. Remove the protective film from the detector head.
2. Snap the trim ring into place on the base.
3. Place the detector head in the base and turn it until the detector head drops into the alignment grooves.
4. Push the center of the detector until it locks into place. It clicks and springs up.

Start-up

1. Check the wiring from the control panel to the last head on the run for proper polarity and continuity.
2. Make sure each run terminates with an EOL resistor as specified by the control panel manufacturer.
3. Apply power to the system. Check for alarm and troubles.
4. If single detectors alarmed or went in trouble, check if there is a free space of at least 19 in. (50 cm) around these detectors. If the problem persists, replace these detectors or swap them with known good units. If also the good units alarm or go in trouble, the sensitivity may have been affected by the surrounding environment. Recheck if there are any obstructions around the detector which may reflect the light emitted by the detector.
5. Activate the dry reed contact of each detector for 10 sec with a magnet until the detector alarms (see Section 5., Dry Reed Contact and Section 6., Electronical Function Test). Then reset the detector by removing the power for at least 2 seconds. After the reset, the detector will calibrate itself to the surrounding environment.. Make sure that no objects or obstructions (like the test tool SOLO330 itself) are in front of the detector during calibration for 15 sec.

After installation each detector must be calibrated. If there are any obstruction in front of the detector after the reset during its calibration (Electronic Function Test, Section 6.), the sensitivity of the detector may be affected.

6. Perform the sensitivity test described in Section 7. at every detector.

4. Maintenance and Service

- Trained personnel should perform a visual and physical test according Table 6 as recommended by NFPA-72 (National Fire Alarm Code).
- For cleaning the detector surface, use a common window cleaner and a soft, clean cloth.

Notify all concerned parties before any maintenance or testing of the fire alarm system, and after completion of these activities.

Note:

- The FCP-500-C and FCP-500-C-P must be replaced every five years. The chemical (CO) sensor turns off at five years of operation. The LED double-flashes every 8 to 12 sec, indicating trouble, and the detector continues to function as an optical (O) detector.

Table 6: Testing Detector

Test Steps		Detector Type	
		FCP-500 FCP-500-P	FCP-500-C FCP-500-C-P
1	Check the LED (see Table 7)	X	X
2	Check the detector's mounting	X	X
3	Visually check for damage or contamination of the detector surface	X	X
4	Check the area for factors (such as lightening) that could inhibit the detector's performance	X	X
5	Perform Electronic Functional Test (see Section 6.)	X	X
6	Perform Sensitivity Test (see Section 7.)	X	X
7	Test the optical sensor (see Section 8.)	X	X
8	Test the optical sensor and the CO sensor (see Section 9.)	-	X

Table 7: LED Operation

Status	LED
Normal	green, flashes every 8 sec
Alarm	red, steady
Trouble	green, double flash every 8 to12 sec
Test mode	green, flashes once every second

5. Dry Reed Contact

1. Place the test tool with the FAA-500-TTL test adapter with magnet up against the detector head.
2. Turn the test tool until the magnet activates the dry reed contact (see Fig. 9.). Normally the green LED flashes once every 8 to 12 sec. When the dry reed contact activates, the LED flashes once every second.

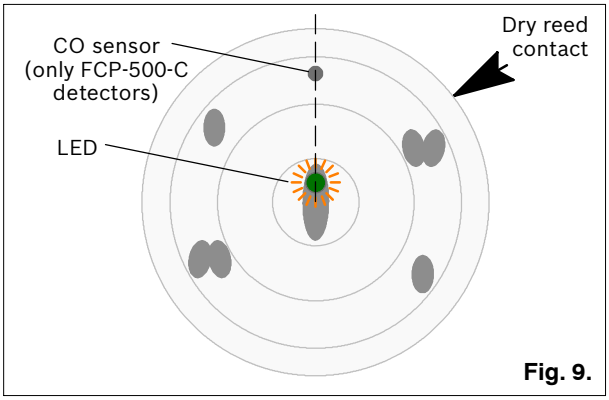

Fig. 9.

6. Electronic Functional Test

1. Activate the dry reed contact (Section 5, Dry Reed Contact).
2. Leave the magnet on the test tool by the dry reed contact for 10 sec. Count 10 flashes of the LED. The detector activates a test alarm and the LED turns red.

Notify all concerned parties before any maintenance or testing of the fire alarm system, and after completion of these activities.

7. Sensitivity Test

1. Activate the dry reed contact (Section 5, Dry Reed Contact).
2. Leave the magnet on the test tool by the dry reed contact for 5 sec. Count 5 flashes of the LED.
3. Remove the test tool. Refer to Table 8 for the LED Display.

Table 8: Sensitivity Test LED Display

Number of Red LED Flashes	Detector's State
1 to 3	Operating normally with little or no dirt contamination
4 to 6	Dirty, needs immediate cleaning
7 to 10	Trouble condition, very dirty, clean and check detector immediately

8. Smoke Test for the FCP-500 / FCP-500-P

Note: No testing gas (smoke aerosol) is required! For testing use only:
- Test Tool for Optical Smoke Detectors Solo 330 (Product ID 4.998.112.071)
- with FAA-500-TTL Test Adapter with Magnet (Product ID F.01U.508.725)

1. Activate the dry reed contact (Section 5., Dry Reed Contact).
2. Leave the magnet on the test tool by the dry reed contact for at least 2 sec and not more than 4 sec. Count two flashes of the LED. The detector stays in test mode for 60 sec. The green LED blinks once a second.
3. Hold the test tool under the detector so that the test beaker is flush with the trim ring.
   Note: Do not tip the test tool, or the detector might come loose.
4. By covering the scattered light areas, both optical sensors are triggered simultaneously (no smoke aerosol is required).
5. This can take up to 20 sec. An alarm activates and the red LED lights. If the panel is in test mode, the alarm resets automatically.

9. CO and Smoke Test for the FCP-500-C / FCP-500-C-P

The CO sensor has not been evaluated to the requirements of UL 2075 or for its ability to detect a fire.

The FCP-500-C and FCP-500-C-P detect carbon monoxide (CO) as a component of a fire. It is not a CO detector and cannot activate an alarm in the presence of CO only. It is used to adjust the sensitivity of the smoke detector.

Perform the CO sensor test once a year to confirm that the sensor is functioning.

Note: For testing use only:
- Test Tool for Optical Smoke Detectors Solo 330 (Product ID 4.998.112.071)
- with FAA-500-TTL Test Adapter with Magnet (Product ID F.01U.508.725)
- Solo CO Testing Gas (Product ID 4.998.142.221)

1. Conduct step 1 to 5 of Section 8. (Smoke Test) to ensure that the smoke sensor is functioning. After this an alarm activates and the red LED lights steady. Don't reset the detector.
2. If over 70 ppm of carbon monoxide is applied to the detector, the red LED of the detector starts flashing. This indicates that the carbon monoxide sensor is working.
3. Reset the detector by removing the power.

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