

# F220 Photoelectric Smoke Detectors

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Invented for life



- ▶ Two-wire or four-wire bases
- ▶ 30 ft (9 m) maximum spacing between detectors
- ▶ Optional CO-sensor, heat-sensor enhanced detection chamber
- ▶ Clean chamber without removal or disassembly
- ▶ CleanMe signaling capability

The F220 Photoelectric Smoke Detectors are UL Listed, open-area photoelectric smoke detectors. Use them with commercial fire protective signaling systems and household fire warning systems (see NFPA 72, the National Fire Alarm Code). These smoke detectors scatter light using a pulsed infrared source operating with a gated, high-speed, photodiode infrared sensor. The symmetry of the optical chamber allows 360° uniform smoke entry, but minimizes external light entry. The detectors use low current electronic circuitry, so they can connect to 12 VDC nominal or 24 VDC nominal power source circuits.

## Functions

### Compatible Bases

Configure the detectors into two-wire or four-wire versions by selecting the appropriate mounting base. These detectors are compatible with any of the F220-B6 bases:

- F220-B6 12/24 VDC Two-wire Mounting Base
- F220-B6R Standard 12/24 VDC Four-wire Mounting Base
- F220-B6RS 24 VDC Four-wire Mounting Base with Sounder
- F220-B6C 12/24 VDC Four-wire Mounting Base with Auxiliary Relay

- F220-B6E 12/24 VDC Four-wire Power Supervision Mounting Base
- F220-B6PM 24 VDC Four-wire Addressable Master Base
- F220-B6PS 12/24 VDC Four-wire Addressable Base

### Monitoring the Detection Chamber

These detectors have several features that work together to maximize the performance of the optical chamber:

- **Compensation:** The detector monitors the chamber for the effects of dust build-up within the chamber and automatically compensates for these effects. If the chamber becomes contaminated beyond its ability to compensate, the green LED flashes every 4 sec to indicate trouble.
- **Chamber Check Self-diagnostics:** The detector automatically indicates visually if the calibration is out of the factory-listed range. This meets NFPA guidelines for sensitivity testing, because you can visually inspect the detector and check the flash rate of the LED. If the calibration is out of range, the green LED on the detector flashes once every 4 sec. This indicates that the detector must be cleaned following the instructions provided with the detector.

- **CleanMe Mode:** Indicates if the calibration is out of the factory-listed range by sending a trouble signal to the CleanMe-compatible control panel, if so programmed.
- **Chambermaid:** The detector has a unique cleaning mechanism. Use the valve on the back of the detector to insert the nozzle of a can of clean, dry compressed air. Clean the chamber with a short (1 to 2 sec) blast of air.

### Heat and Carbon Monoxide Enhancements

The detectors are available with an optional fixed-temperature heat sensor, a carbon monoxide (CO) sensor, or a combination of heat and CO sensors. These optional sensors enhance the operation of the smoke detector by reducing false alarms.

- **Carbon Monoxide:** Without the presence of CO, a normal byproduct of combustion, the detection chamber is half as sensitive to smoke as a standard commercial photoelectric smoke chamber. This reduces false alarms. When the sensor detects CO, the detection chamber's sensitivity to smoke increases so it equals or exceeds that of a standard commercial photoelectric smoke chamber.



#### Notice

The F220-PTHC detects 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.

- **Heat:** When the heat sensor detects a temperature rise, the photoelectric chamber becomes more smoke sensitive. The heat sensor initiates an alarm if the ambient temperature exceeds +135°F (+57°C).

### Dual-color LED

A dual-color LED indicator flashes green every 8 sec when the detector has power and the smoke sampling circuitry is working. If CleanMe is enabled, the green LED double flashes (two flashes a half second apart) every 8 sec to indicate normal operation. The LED turns red if an alarm is sent. After the alarm condition clears, reset the detector by interrupting its power. If the chamber becomes contaminated beyond its ability to compensate, the green LED flashes every 4 sec to indicate trouble.

### Test Functions

The F220 Photoelectric Smoke Detectors feature a unique magnet operation and sensitivity test function. Test the detector's operation by placing the magnet next to the detector's LED for three consecutive flashes. This causes the detector to send an alarm. Placing a magnet next to the detector's LED for at least one red flash but less than three flashes activates the detector's sensitivity mode.

### Tamper Detection

When detector heads are correctly installed in any of the F220-B6 bases, the positive power line provides tamper detection. The control panel initiates a trouble

signal if a detector is removed from its base. A mechanical tamper lock comes with each base to prevent unauthorized head removal.

### Certifications and approvals

| Region    | Certification |   |
|-----------|---------------|---|
| Europe    | CE            | 89/336/EEC, EN50130-4/A Sept 1998, EN61000-6-3 Oct 2001   |
| USA       | UL            | UROX: Smoke-automatic Fire Detectors (ANSI/UL 268), UROX7: Smoke-automatic Fire Detectors Certified for Canada (CAN/ULC-S529) |
|           | FM            | F220 Smokes   |
|           | CSFM          | see our website   |
|           | NYC-MEA       | 117-05-E  |
| Hong Kong | MSFM          | 2200 Sep 2008   |
|           | HKFSD         | (P and PTH only)  |

### Installation/configuration notes

#### Compatible Control Panels

**Addressable Systems:** compatible with addressable systems controlled by D9412GV2, D7412GV2, D9412G, or D7412G Control Panels or the D9124 Fire Alarm Control Panel when used with the F220-B6PM or F220-B6PS Addressable Detector Bases.

**Two-wire:** Bosch Security Systems, Inc. makes no claim written, oral, or implied that the F220 Photoelectric Smoke Detectors work with any two-wire control panels except those specified in the Control Panel Compatibility chart in the Technical Service Note (P/N: 4998148185).

**Four-wire:** compatible with all UL Listed four-wire control panels. Refer to the control panel's installation instructions for proper end-of-line (EOL) resistor selection.

#### Mounting the Bases



#### Notice

Consult NFPA-72 for proper detector placement.

Depending on local regulations, the bases can be surface mounted directly on four-inch square or octagonal electrical boxes and single-gang switch boxes.



#### Notice

The volume of any electrical box used should be large enough to accommodate the number and size of conductors as specified by the National Electrical Code or any local authorities having jurisdiction (AHJ).

### Loop Supervision

Loop supervision requires one D275 or F220-B6E per loop when using F220-B6R/B6C bases and is supervised by the control panel.

### Wiring the Bases

Refer to the F220 Series Detectors with F220-B6/C/E/R Bases Installation Instructions (P/N: 4998138694), the F220 Series Detectors with F220-B6RS Bases Installation Instructions (P/N: F01U029847), or the F220-B6PS/M Installation Instructions (P/N: 4998149982) for detailed wiring instructions.

### Parts included

| Quantity | Component                |
|----------|--------------------------|
| 1        | Detector with dust cover |

### Technical specifications

#### Environmental

|                                 |   |
|---------------------------------|---|
| Relative Humidity:              | 0% to 95% non-condensing;<br>15% to 95% non-condensing for CO sensing model |
| Temperature (normal operating): | +32°F to +100°F (0°C to +38°C)  |

#### Mechanical

|                            |  |
|----------------------------|--|
| Color:                     | White                                  |
| Dimensions (diameter x H): | 6.75 in. x 2.25 in. (17.1 cm x 6.4 cm) |

#### Electrical

|  |  |
|--|--|
| Current (alarm):<br>(detector head only) | 20 mA minimum at 8.5 VDC;<br>35 mA maximum at 32 VDC |
| Current (start-Up):                      | 0.12 mA maximum at 32 VDC                            |
| Maximum RMS Ripple:                      | 25% of DC input                                      |
| Power-up Time:                           | 22 seconds maximum                                   |

#### Voltage (standby)

|                     |  |
|---------------------|--|
| F220-B6:            | 8.5 VDC to 32.0 VDC  |
| F220-B6C/-B6R/-B6E: | 10.0 VDC to 30.0 VDC   |
| F220-B6RS:          | 16.0 VDC to 30.0 VDC   |
| F220-B6PM:          | with D299: 18.9 VDC to 28.0 VDC<br>without D299: 9.6 VDC to 28.0 VDC |
| F220-B6PS:          | 18.9 VDC to 28.0 VDC   |

### Trademarks

All hardware and software product names used in this document are likely to be registered trademarks and must be treated accordingly.

### Ordering information

#### F220-PTHC Photoelectric Smoke Detector with +135°F (+57°C) Heat and Carbon Monoxide Sensors

Photoelectric detector head with heat and CO sensor augmentation only; requires base.

Order number **F220-PTHC**

#### F220-PTH Photoelectric Smoke Detector with +135°F (+57°C) Heat Sensor

Photoelectric detector head with heat sensor only; requires base.

Order number **F220-PTH**

#### F220-P Photoelectric Smoke Detector

Photoelectric detector head only; requires base.

Order number **F220-P**

### Accessories

#### D275 Power Supervision Module

Line supervision device for four-wire fire detection circuits

Order number **D275**

#### DRA-5 Remote Annunciator (5 VDC)

Designed to provide remote annunciation of alarms for a number of Bosch smoke and heat detectors

Order number **DRA-5**

#### DT-2 Detector Removal Tool

Use the DT-2 to remove, replace, or test the detector head

Order number **DT-2**

#### F220-B6 12/24 VDC Two-wire Base

Standard base for two-wire (12 VDC or 24 VDC system) applications.

Order number **F220-B6**

#### F220-B6R Standard 12/24 VDC Four-wire Base

Standard base for four-wire (12 VDC or 24 VDC) detector systems.

Order number **F220-B6R**

#### F220-B6RS 24 VDC Four-wire Detector Base with Sounder

Four-wire detector base with sounder for use with the F220 Series Photoelectric Smoke and Heat Detectors.

Order number **F220-B6RS**

#### F220-B6C 12/24 VDC Four-wire Base with Auxiliary Form C Relay

Four-wire base with a normally-open (NO) alarm loop relay and a set of auxiliary contacts (Form C).

Order number **F220-B6C**

#### F220-B6E 12/24 VDC Four-wire Power Supervision Base with End-of-line Power Monitoring Relay

Four-wire base with a normally-open (NO) alarm relay and an EOL power supervision relay.

Order number **F220-B6E**

**F220-B6PM 24 VDC Four-wire Addressable Master Detector Base**

The Master base provides an address on the FACP data expansion circuit for its detector and up to an additional 19 detectors. It accepts the F220 Photoelectric Smoke Detector Heads and Heat Detector Heads.

Order number **F220-B6PM**

**F220-B6PS 12/24 VDC Four-wire Addressable Standard Detector Base**

The Standard base provides an address on the FACP data expansion circuit for its detector. It accepts the F220 Photoelectric Smoke Detector Heads and Heat Detector Heads.

Order number **F220-B6PS**

**Represented by:****Americas:**

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

**Europe, Middle East, Africa:**

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

**Asia-Pacific:**

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

**China:**

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

**America Latina:**

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