



# F220 Photoelectric Smoke Detectors



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

- ▶ 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
- ▶ Sensitivity readout on detector
- ▶ Detector chamber compensates for dust build-up
- ▶ Tamper protection
- ▶ Dual-color LED

- 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.

**Note** 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 (UL268 and A), UROX7: Smoke - Automatic Fire Detectors Certified for Canada (cULus)
	FM	
	CSFM	7272-1615: 0106 SMOKE DETECTOR-SYSTEM TYPE-PHOTOELECTRIC [F220-P, F220-PTH] 7272-1615:0107 SMOKE DETECTOR-SYSTEM TYPE-PHOTOELECTRIC [F220-PTHC]
	NYC-MEA	117-05-E
	MSFM	2200 Sep 2008
Hong Kong	HKFSD	

**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**

**Note** 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.

**Note** 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.

**Technical Specifications**

**Environmental Considerations**

Relative Humidity: 0% to 95% non-condensing; 15% to 95% non-condensing for CO sensing model

Temperature (normal operating): +32°F to +100°F (0°C to +38°C)

**Mechanical Properties**

Color: White

Dimensions (diameter x H): 6.75 in. x 2.25 in. (17.1 cm x 6.4 cm)

**Power Requirements**

Current (alarm): 20 mA minimum at 8.5 VDC; (detector head only) 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 without D299: 9.6 VDC to 28.0 VDC

F220-B6PS: 18.9 VDC to 28.0 VDC

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**Ordering Information**

<b>F220-PTHC Photoelectric Smoke Detector with +135°F (+57°C) Heat and Carbon Monoxide Sensors</b> Photoelectric detector head with heat and CO sensor augmentation only; requires base.	<b>F220-PTHC</b>
<b>F220-PTH Photoelectric Smoke Detector with +135°F (+57°C) Heat Sensor</b> Photoelectric detector head with heat sensor only; requires base.	<b>F220-PTH</b>
<b>F220-P Photoelectric Smoke Detector</b> Photoelectric detector head only; requires base.	<b>F220-P</b>
<b>Accessories</b>	
<b>D275 Power Supervision Module</b> Line supervision device for four-wire fire detection circuits	<b>D275</b>
<b>DRA-5 Remote Annunciator (5 VDC)</b> Designed to provide remote annunciation of alarms for a number of Bosch smoke and heat detectors	<b>DRA-5</b>
<b>DT-2 Detector Removal Tool</b> Use the DT-2 to remove, replace, or test the detector head	<b>DT-2</b>
<b>F220-B6 12/24 VDC Two-wire Base</b> Standard base for two-wire (12 VDC or 24 VDC system) applications.	<b>F220-B6</b>
<b>F220-B6R Standard 12/24 VDC Four-wire Base</b> Standard base for four-wire (12 VDC or 24 VDC) detector systems.	<b>F220-B6R</b>
<b>F220-B6RS 24 VDC Four-wire Detector Base with Sounder</b> Four-wire detector base with sounder for use with the F220 Series Photoelectric Smoke and Heat Detectors.	<b>F220-B6RS</b>
<b>F220-B6C 12/24 VDC Four-wire Base with Auxiliary Form C Relay</b> Four-wire base with a normally-open (NO) alarm loop relay and a set of auxiliary contacts (Form C).	<b>F220-B6C</b>
<b>F220-B6E 12/24 VDC Four-wire Power Supervision Base with End-of-line Power Monitoring Relay</b> Four-wire base with a normally-open (NO) alarm relay and an EOL power supervision relay.	<b>F220-B6E</b>
<b>F220-B6PM 24 VDC Four-wire Addressable Master Base</b> Provides individual addresses on the FACP data expansion circuit and accepts the F220 Series Photoelectric Smoke Detector and Heat Detector Heads.	<b>F220-B6PM</b>
<b>F220-B6PS 12/24 VDC Four-wire Addressable Base</b> Used in a slave circuit with the F220-B6PM as master base.	<b>F220-B6PS</b>

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