

# Intelligent Detection Devices

## Photoelectric Smoke Detector Model FDO421

### ARCHITECT AND ENGINEER SPECIFICATIONS

- Compatible with Siemens Model 'H'-series devices on the same loop (with Desigo fire-alarm control panels [FACPs] or FireFinder® XLS FACPs)
- Compatible with Model DPU (device programmer / loop tester)
- Utilizes advanced microprocessor-based signal processing
- Extended temperature and humidity operating range
- Each detector is self-testing:
  - Self monitored for sensitivity within @UL Listed limits
  - Complete diagnostics performed every 10 seconds
- Polarity insensitive utilizing *SureWire™* technology
- Compatible with Model DB-11-series mounting bases
- Tri-color detector-status LED with 360° viewing
- Field-selectable application sensitivity profiles
- Remote sensitivity-measurement capability
- Utilizes advanced signal processing
- Superior EMI / RFI immunity
- RoHS compliant



- Automatic environment compensation
- @ULC Listed; FM (#3230, 3210), CSFM (#7272-0067:0258) Approved

### Product Overview

The Model FDO421 Photoelectric Smoke Detector uses state-of-the-art microcontroller circuitry and surface-mount technology for maximum reliability. Model FDO421 incorporates an optical sensor using a light-scattering detection principle. The device utilizes advanced software algorithms to analyze the signals, and provides highly stable and accurate smoke detection.

Further, Model FDO421 uses state-of-the-art microprocessor circuitry with error check; detector self-diagnostics, and supervision programs.

### Field-Device Programmer

Model FDO421 is compatible with the Siemens – Fire Safety field-device programmer / test unit (Model DPU), which is a compact, portable and menu-driven accessory for electronically programming and testing detectors easily and reliably.

Model DPU eliminates the need for cumbersome, unreliable mechanical programming methods – such as dials or switches – and reduces installation and service costs by electronically programming and testing the detector prior to installation.

For proper operation of Model DPU, the technician selects the accessory's program mode, and enters the desired address. In turn, Model DPU automatically sets and verifies the address, as well as tests the detector. When in the 'test' mode, Model DPU will perform a series of diagnostic tests without altering the address or other stored data, allowing technicians to determine if the detector is operating properly.

Model DPU operates on AC power or rechargeable batteries, providing flexibility and convenience in programming and testing equipment from practically any location.

Photoelectric Smoke Detector **6152C**

## Product Overview — (continued)

Model FDO421 is a plug-in, two-wire and addressable photoelectric smoke detector. Model FDO421 is ©Underwriters' Laboratories Listed. [©UL268A Listed for direct in-air duct usage]

Each detector consists of a dust-resistant photoelectric chamber and microprocessor-based electronics with a low-profile plastic housing. Every Model FDO421 fire detector is shipped with a protective dust cover:

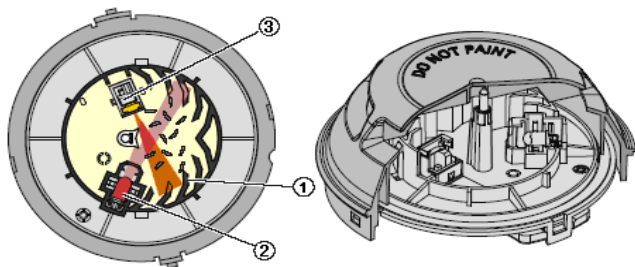


1. Dust cover
2. Smoke detector

## Operation

Model FDO421 is a wide-spectrum, photoelectric smoke detector incorporating an infrared light-emitting diode (IRLED), and infrared light-sensing photodiode. Under normal conditions, light transmitted by the LED is directed away from the photodiode and scattered through the smoke chamber in a controlled pattern.

The smoke chamber is designed to manage light dissipation and extraneous reflections from dust particles or other non-smoke, airborne contaminants in such a way as to maintain stable, consistent detector operation. When smoke enters the detector chamber, light emitted from the IRLED is scattered by the smoke particles, and is received by the photodiode:



1. Labyrinth
2. Optical transmitter
3. Optical receiver

## Sensitivity Settings

### Application Parameter Sets

Model FDO421 provides four (4) pre-programmed sensitivity parameter sets that can be selected by the FACP to match the expected application or environmental conditions:

- Sensitive
- Standard
- Robust
- Air-duct

**Sensitive:** This application parameter set is practically suitable for areas where few misleading sources of false alarm are present, and is appropriate where priority is given to detecting open fires as soon as possible (e.g. – typically a clean application with controlled environmental conditions.)

**Standard:** This application parameter set is practically apt for normal office, hotel-lobby-type applications, and is the default setting.

**Robust:** This application parameter set offers improved resistance to false alarms in areas where misleading sources, such as cigarette smoke or exhaust fumes, may cause a nuisance alarm.

**Air-Duct:** This application parameter set is used when the detector is used a ©UL268A (DI) compliant direct in-air duct application without a duct housing.

Model FDO421 does not require a field sensitivity test. Model FDO421 is ©UL Listed as a self-testing device and complies with NFPA 72 as a self monitoring detector and control panel arrangement. Additionally, this parameter set is also used when Model FDO421 is used in air-duct housings (Models FDBZ492 and FDBZ492-HR).

The visible LED flashes green every 10 seconds to indicate communication with the FACP, and to notify Model FDO421 has passed its self-test. Should Model FDO421 sense a fault or failure within its system, the LED will flash amber, and the detector will transmit the data to the FACP.

A quick visual inspection is sufficient to indicate the condition of Model FDO421 at any time. If more detailed information is required, a printed report can be provided from the compatible FACP, indicating the status and settings assigned to each individual detector. When Model FDO421 moves to the alarm mode, the detector will flash red and continue flashing until the system is reset at the FACP. At that same time, any user-defined, system-alarm functions programmed into the system are activated.

Model FDO421 contains a tri-color LED indicator, capable of flashing any one (1) of three (3) distinct colors: green, yellow, or red. During each flash interval, the microprocessor-based detector monitors the following:

- Smoke sensitivity is within the range indicated on the nameplate label
- Smoke in its sensing chamber
- Internal sensors and electronics are functional

## Operation – (continued)

Based on the monitoring results, the LED indicator flashes the following colors based on the following conditions:

Flash Color	Condition	Flash Interval (in seconds)
Green*:	Normal supervisory operation. Smoke sensitivity is within rated limits.	10
Yellow:	Detector is in trouble and needs replacement.	4
Red:	Alarm condition.	1
No Flash:	Detector is not powered.	--

\* LED can be turned OFF.

Please follow the corresponding description of the panel used.

A quick visual inspection is sufficient to indicate the condition of the detector at any time. If more detailed information is required, a printed report can be provided from the respective Desigo FACP that indicates the status and settings assigned to each individual detector.

## Installation

All Model FDO421 detectors use a surface-mounting base, Model DB-11 or Model DB-11E, which mounts on a 4-inch octagonal, square or single-gang electrical box. The base utilizes screw-clamp contacts for electrical connections and self-wiping contacts for increased reliability.

The Model DB-11 base can be used with the optional Model LK-11 detector locking kit, which contains 50 detector locks and an installation tool to prevent unauthorized removal of the detector head. Model DB-11 has decorative plugs to cover the outer mounting screw holes.

Model FDO421 may be installed on the same initiating circuit with the following Siemens Model 'H'-series detectors [when used with the Desigo FACPs] –

- Model HFP-11
- Model 'HMS'-series manual stations
- Model 'HTRI'-series interfaces
- Model HCP output-control devices
- Model 'HZM'-series of addressable, conventional zone modules

## Application Data

Installation of Model FDO421 detectors requires a (2) two-wire circuit. In many retrofit cases, existing wiring may be used. 'T-tapping' is permitted only for 'Style 4' (Class B) wiring. Model FDO421 is polarity insensitive, which allows a substantial reduction in installation and debugging time.

Model FDO421 can be applied within the maximum 30-foot center spacing (900 sq. ft. areas,) as referenced in NFPA 72. This application guideline is based on ideal conditions – specifically, smooth ceiling surfaces, minimal air movement, and no physical obstructions between potential fire sources and the actual detector.

Do not mount detectors in close proximity to ventilation or heating and air-conditioning outlets. Exposed joints or beamed ceilings may also affect safe spacing limitations for detectors.

Should questions arise regarding detector placement, observe NFPA 72 guidelines. Good fire-protection system engineering and common sense dictate how and when fire detectors are installed and used. Contact your local Siemens Industry – Fire Safety distributor or sales office whenever you need assistance applying Model FDO421 in unusual applications. Be sure to follow NFPA guidelines and <sup>®</sup>ULC Listed installation instructions – included with every Siemens – Fire Safety detector – and local codes as for all fire protection equipment.

## Technical Data

**Operating Temperature Range:** +32°F (0°C) to 120°F (49°C)

**Relative Humidity:** 0 – 95%; non-condensing

**Air Pressure:** No effect

**Air Velocity:** 0 – 4,000 ft. / min (0-20m / sec)

**Input Voltage Range:** 16VDC – 30VDC

**Alarm Current (max.):** 280µA

**Standby Current (max.):** 280µA, max. (average)

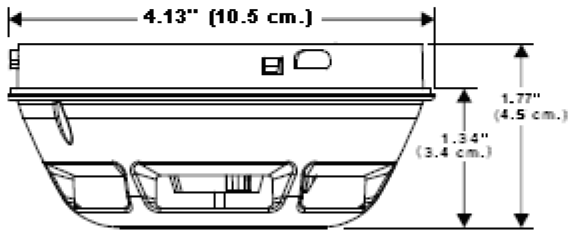
**Maximum Spacing:** 30-foot centers (900 sq. ft.), per NFPA 72

**Detector Weight:** 0.317 Lbs. (0.144 Kg.)

### Mechanical Protection Guard:

<sup>®</sup>UL Listed / <sup>®</sup>ULC Listed  
[with STI Guard Model STI-9604]

## Mounting Diagram Dimensions



## Detector Compatibility Table

Model	Data Sheet Number	Description
—	6300	FireFinder® XLS (system overview)
FC2025	6815C	252-point system (networkable)
FC2050	6815C	504-point system (networkable)
FV2025	6821	252-point intelligent voice communication system
FV2050	6821	504-point intelligent voice communication system

## Details for Ordering

Model	Part Number	Description
FDO421	S54320-F4-A1	Photoelectric Smoke Detector
DB-11	500-094151	Detector Mounting Base
DB-11E	500-094151E	Detector Base {small}
DB2-HR	S54320-F12-A1	Relay Base
RL-HC	500-033230	Remote Alarm Indicator: 4" octagon-box mount, red
RL-HW	500-033310	Remote Alarm Indicator: Single-gang box mount, red
FDBZ492	S54319-B22-A1	Addressable Air-Duct Housing
FDBZ492-HR	S54319-B23-A1	Addressable Air-Duct Detector with Relay
LK-11	500-695350	Base Locking Kit

### In Canada, order:

Model	Part Number	Description
DB-11C	500-095687	Detector Mounting Base for @ULC (Listed)

**Notice:** This marketing data sheet is not intended to be used for system design or installation purposes. For the most up-to-date information, refer to each product's installation instructions.