

Desigo® Fire Safety Detectors and Peripherals

Photoelectric Smoke Detector Model FDO421

Architect & Engineer Specifications

- UL 268 7th edition Listed
- Built-in **ISOtechnology™**
- 252 Isolation devices per SLC
- Compatible with `H'-series devices on the same loop (with Desigo Fire Safety series fire-alarm control panels)
- Compatible with Model DPU (device programmer / loop tester)
- Each detector is self-testing:
 - self-monitored for sensitivity with UL Listed limits
 - complete diagnostics performed every 10 seconds
- Polarity insensitive via **SureWire™** technology
- Functions with Model DB-11-series mounting bases
- Tri-color detector-status light-emitting diode (LED) with 360 ° view
- Field-selectable application - sensitivity profiles
- Remote sensitivity - measurement capability
- Utilizes advanced, microprocessor-based signal processing
- Supports Alarm Verification (AV) feature
- Automatic environment compensation
- Superior electromagnetic interference (EMI) and radio-frequency interference (RFI) immunity
- Restriction of Hazardous Substances (ROHS compliant)
- UL Listed | FM & CSFM Approved
 - UL 268: `Open Area Smoke Detection'
 - UL 268A (Duct) - `In-duct housing' use
 - UL 268A (Duct) - `Direct-in-Duct' use
 - ULC-S529: `System Smoke Detection'
 - ULC-S530: `Heat Actuated Fire Detection'
 - FM 3230
 - CSFM | File: 7272-0067:0258

Product Overview

The Photoelectric Smoke Detector (Model FDO421) 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.

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

Each detector is UL 268 7th edition listed incorporating advanced built-in **ISOtechnology™** - True Class-X SLC operation (use is optional) greatly improving system reliability and circuit integrity while providing advanced addressable fault finding.

The unit fits into one (1) wall-or-ceiling footprint, and only occupies one (1) address on the signal-line circuit (SLC).

Model FDO421 is a plug-in, two-wire, addressable photoelectric smoke detector whose value is increased with built-in **ISOtechnology** feature. 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.

Operation

Model FDO421 is a wide-spectrum, photoelectric smoke detector that incorporates an infrared light-emitting diode (IRLED), as well as a 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.

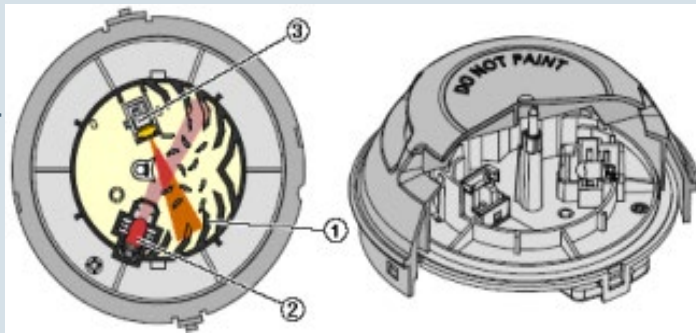
The smoke chamber is designed to manage light dissipation and extraneous reflections from dust particles or other non-smoke, airborne contaminants in such a way as to maintain stable, consistent detector operation. When smoke enters the detector chamber, light emitted from the IRLED is scattered by the smoke particles and is received by the photodiode (see: images on page 2).



Model FDO421
Photoelectric Smoke Detector



1. Labyrinth
2. Optical transmitter
3. Optical receiver



Model FDO421

1. Dust cover
2. Photoelectric smoke detector



Sensitivity Settings

Application Parameter Sets

Model FDO421 provides two (2) pre-programmed sensitivity parameter sets that can be selected by the Siemens fire-alarm control panel in order to match the expected application or environmental conditions:

- Standard
- Air-duct

Standard: This application parameter set, which is ideal for normal office | hotel-lobby-type applications, is the default setting.

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. This parameter set is also used when Model FDO421 is used in air-duct housings (Models FDBZ492 and FDBZ492-HR).

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 '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** | **RED**. During each flash interval, the microprocessor-based detector monitors the following scenarios:

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

Based on the results of the monitoring, the LED indicator flashes the following:

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.	—

* denotes LED can be turned OFF
Please follow the corresponding description of the panel used.

Installation

All Model FDO421 intelligent, addressable detectors use a surface-mounting base (Model DB-11 or DB-11E), which mounts on a 4-inch (10.2 cm.) octagonal, square or single-gang electrical back box. The base utilizes screw-clamp contacts for electrical connections and self-wiping contacts for increased reliability.

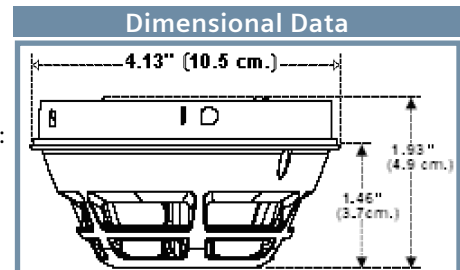
The Model DB-11 detector base can be used with the optional Siemens Model LK-11 detector locking kit, which contains 50 detector locks and an installation tool to prevent unauthorized removal of the detector head. Model DB-11 has aesthetically conducive plugs to cover the outer mounting-screw holes.

Model FDO421 may be installed on the same initiating circuit with the Siemens Model 'H'-series detectors [when used with Desigo Fire Safety Modular | FireFinder XLS/V | FC/FV20-series FACPs] –

- XTRI series interface modules
- HTRI series interface modules
- HMS & XMS series manual stations
- HFP-11, HFPT-11 detection devices
- HCP output-control module
- HZM conventional zone module

Each detector, which is shipped with a protective dust cover, consists of the following:

- Built-in **ISOtechnology** for True-Class-X SLC performance
- Dust-resistant photoelectric chamber
- Microprocessor-based electronics with a low-profile plastic housing



All Model FDO421 intelligent, addressable detectors are approved for operation with the Underwriters' Laboratories-specified temperature range of 32° to 100°F (0° to 38°C). (See: installation manual **P/N – A6V10323928** for further details)

Application Data

Installation of Model FDO421 smoke detectors require a 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 can greatly reduce installation and debugging times. When operating in NFPA 72 Class-X applications SLC polarity must be maintained to support up to 252 isolation ready devices per loop. When used in mixed mode a maximum of 30 non-isolated devices between isolation devices (wired in polarity-insensitive mode). See control panel install document for further details.

Model FDO421 detectors 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 near ventilation or heating and air conditioning outlets. Exposed joists or beamed ceilings may also affect safe spacing limitations for detectors. For challenging site applications, use of the alarm verification feature should be considered. Consult the associated control panel engineering tool for details on implementation.

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 – Fire Safety distributor or sales office whenever you need assistance applying Model FDO421 in unusual applications. Be sure to follow NFPA guidelines and UL Listed / ULC Listed installation instructions – included with every Siemens – Fire Safety detector – and local codes as for all fire protection equipment.

Field-Device Programmer / Test Unit

Model FDO421 is compatible with the Siemens field-device programmer / test unit (Model DPU), which is a compact, portable menu-driven accessory for electronically programming and testing these addressable detectors promptly and reliably. For instance, the field technician selects the accessory's program mode, and enters the desired address.

Model DPU eliminates the need for cumbersome, unreliable mechanical programming methods (e.g. – dials and rotary switches), and reduces installation and service costs by electronically programming and testing the detector prior to installation. When set in '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.

Each field-device programmer / test unit operates on AC power or rechargeable batteries, providing flexibility and convenience in the programming / testing of fire-safety equipment from practically any location. Additionally, with the use of a Model DPU unit, there is no longer a cause for concern with any vibration, corrosion and other deteriorating conditions that can accompany the vitality of electro-mechanical-addressing mechanisms.

Each detector fits into one (1) wall-or-ceiling footprint, and only occupies one (1) address on the signal-line circuit (SLC).

Technical Data	
OPERATING TEMPERATURE:	+32° – +100°F (0° – +38°C)
RELATIVE HUMIDITY:	0 – 95% (non-condensing)
AIR PRESSURE:	No effect
AIR VELOCITY:	0 – 4,000 feet-per-minute (fpm) (0 – 20 meters-per-second)
INPUT VOLTAGE RANGE:	16VDC – 30VDC
`ALARM' CURRENT, MAX.:	410µA
`STANDBY' CURRENT, MAX.:	250µA
MAXIMUM SPACING:	30–ft. centers (900 sq. ft.), per NFPA 72
DETECTOR WEIGHT:	0.317 Lbs. (0.144 kg.)
MECHANICAL PROTECTION GUARD:	UL and ULC Listed (with STI Guard Model STI-9604)
SENSITIVITY RANGE:	1.41 - 3.76 % / ft obs. (Nominal 2.0 % / ft. obs.)

Panel Compatibilities		
MODEL OR TYPE	DATA SHEET	PANEL
XLS	6300	FireFinder® (fire)
XLSV	6340	FireFinder (fire w/ voice)
DESIGO MODULAR	7300	Desigo Modular (overview)
FC2005	6813	Desigo Fire Safety 50-point addressable
FC2025	6815	Desigo Fire Safety 252-pt. addressable (fire)
FC2050		Desigo Fire Safety 504-pt. addressable (fire)
FV2025	6821	Desigo Fire Safety 252-point addressable (fire w/ Intelligent Voice Communication [IVC])
FV2050		504-pt. addressable (fire w/ Intelligent Voice Communication [IVC])

Details for Ordering		
MODEL OR TYPE	PART NUMBER	PRODUCT
FDO421	S54320-F4-A1	Photoelectric Smoke Detector
Compatible Devices:		
MODEL OR TYPE	PART NUMBER	PRODUCT
ABHW-4B	S54320-F13-A1	Buzzer Version Audible Base (standard 3,000 Hz tone)
ABHW-4BZ	S54320-F13-A2	Audible Base
ABHW-4S	S54320-F14-A1	Sleeping Room Version, 520 Hz Low Frequency Audible Base
ABHW-4SZ	S54320-F14-A2	Audible Base
DB-11	500-094151	Detector Mounting Base
DB-11E	500-094151E	Detector Base, small
DB2-HR	S54370-F12-A1	Detector Mounting Base with Relay
RL-HC	500-033230	Remote Alarm Indicator: 4" (10.2 cm) 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
See: www.STI-USA.com for further details on ordering Model STI-9604		
In Canada order:		
MODEL OR TYPE	PART NUMBER	PRODUCT
DB-11C	500-095687	Detector Mounting Base, ULC Listed

NOTICE – The information contained in this data-sheet document is intended only as a summary, and is subject to change without notice. The product(s) described here has/have a specific instruction sheet(s) that cover various technical, limitation and liability information.

Copies of install-type, instruction sheets – as well as the *General Product Warning and Limitations* document, which also contains important data, are provided with the product, and are available from the Manufacturer.

Data contained in the aforesaid type of documentation should be consulted with a fire-safety professional before specifying or using the product.

Any further questions or assistance concerning particular problems that might arise, relative to the proper functioning of the equipment, please contact the Manufacturer.

SIEMENS

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