SIEMENS
Ingenuity for life

Desigo® Fire Safety
Detectors and Peripherals

Multi-Criteria Fire Detector [with **ASA***technology*™]

Model FDOOT441

Architect & Engineer Specifications

- ☐ Advanced multi-criteria fire detector that has dual-optical thermal sensors
- ☐ Differentiates between deceptive phenomena and an actual fire (nuisance-alarm avoidance)
- ☐ Compatible with Siemens Model `H'-series devices on the same loop (with FireFinder fire-alarm control panels (FACPs)
- ☐ Provides enhanced detection via forward-and-backward light-scattering technology
- ☐ Complies with NFPA 76 (Telco standard) as `VEWFD' high-sensitivity detector
- ☐ UL Listed and FM Approved as a multi-criteria and `VEWFD' fire detector
- ☐ UL 268A Listed for direct air-duct use (4,000 FPM)
- ☐ Supervisory temperature-monitoring feature
- ☐ Remote sensitivity-measurement capability
- ☐ Automatic environment compensation
- ☐ Up to 22 application profiles
- ☐ Tri-color detector-status light-emitting diode (LED)
- ☐ Polarity insensitive via *SureWire™*
- ☐ Low-temperature warning for sprinkler systems, per NFPA 25
- ☐ Meets UL, NFPA 72 requirements for sensitivity self-monitoring
- ☐ Compatible with:
  - Model DB-11–series mounting bases
  - Model 8720 / DPU (device programmer / loop tester)
- ☐ Restriction of Hazardous Substances (RoHS compliant)
- ☐ Responds to both flaming and smoldering-fire signatures
- ☐ UL 268 Listed, ULC Listed; FM (#3230, #3210), CSFM (#7272-0067:0258) Approved

Product Overview

Model FDOOT441 is an advanced, flexible multi-criteria fire detector that incorporates a redundant optical / thermal sensor. Additionally, Model FDOOT441 uses a distinctive forward / backward, light-scattering technology that provides state-of-the-art, unparalleled fire detection to the widest range of fire types.

Each Model FDOOT441 is programmed as a high-sensitivity detector, thus meeting the requirements of NFPA 76 Standard (*for the Fire Protection of Telecommunications Facilities*) as a Very Early Warning Fire Detector (VEWFD).

Each of these multi-purpose, addressable detectors offers a full and modern solution to meet the detection needs for commercial facilities. Model FDOOT441 detectors can be field programmed for simultaneous and / or independent functionality, depending upon the precise customer and application requirements.

For example, the detector can simultaneously utilize the optical and heat sensors for enhanced multi-criteria fire detection, as well as provide independent outputs for heat detection. Any combination of the sensors is possible.

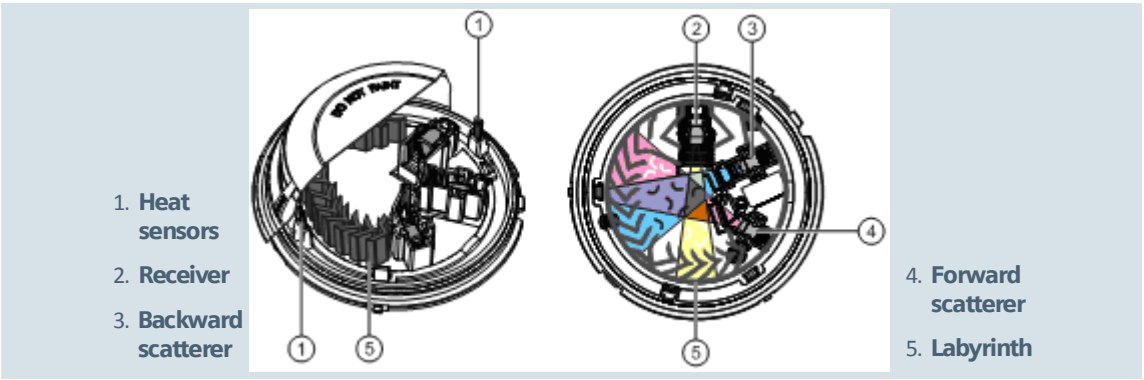
The detector is very versatile, and meets the following fire-industry standards:

- Multi-criteria fire detector (ⓈUL 268)
- Heat detector (ⓈUL 521) with five (5) possible field-selectable temperatures; combined with four (4) rate-of-rise options
- Direct, in-duct (plenum) detector (ⓈUL 268A)
- Supervisory monitoring for temperature ranges
- NFPA 76 (Telco Standard) as VEWFD
- Low-temperature warning signal at 40°F (4.4°C)
  - for sprinkler systems, per NFPA 25 / NFPA 72

Model FDOOT441 provides extremely accurate and reliable fire detection with built-in redundancy. It uses advanced, multi-criteria detection technology known as **ASA** (Advanced Signal Analysis), allowing the detector to distinguish non-threatening deceptive phenomena.

For instance, the signals from the detector's sensors are monitored and processed via the **ASA**–patented algorithm technology, which combines the signals into a neural network to create an intelligent, multi-criteria addressable detector.

Model FDOOT441
Multi-Criteria Fire Detector
[with **ASA***technology***]**



Model FDOOT441
Forward-and-Backward Light-Scattering Technology

Product Overview – (continued)

The encompassing result is an intelligent detector that provides enhanced detection capability to a wide range of products of combustion – while offering unsurpassed rejection to nuisance-alarm sources, including: dust **|** steam **|** aerosols and other deceptive phenomena that could cause false alarms.

Since Model FDOOT441 is a two-wire, addressable device, it is able to function as a multi-purpose detector – satisfying smoke-and-heat detection in a singular, aesthetically pleasing package. Comparable to other multi-functional detectors, Model FDOOT441 also serves as a very cost-effective, viable detection solution that saves on product **|** installation **|** maintenance costs. Each detector fits into one (1) wall-or-ceiling footprint, and only occupies one (1) address on the signal-line circuit (SLC).

A patented forward-and-backward, light-scattering technology, which is able to distinguish both small and large products of combustion, operates at the core of each Model FDOOT441 intelligent, addressable detector. Since each Model FDOOT441 detector provides an eco-friendly solution to legacy ionization detectors, there is subsequently an elimination of any need for having a radioactive source, along with inevitable HAZMAT-disposal requirements. Therefore each detector is capable of detecting both smoldering and flaming fire – all in ecologically efficient manner – and is a valid, RoHS-compliant (Restriction of Hazardous Substances) detection alternative to legacy ionization detectors.

Two (2) thermal sensors make each Model FDOOT441 detector a robust, reliable device suitable for the most challenging applications.

Operation

Forward-and-Backward Light-Scattering Technology

The high-quality, optical-electronic measuring chamber for each Model FDOOT441 houses the following components:

- Two (2) optical transmitters
- One (1) optical receiver
- Two (2) thermal sensors

The transmitters illuminate the smoke particles from different angles: one sensor acts as a forward scatterer, and the other sensor works as a backwards scatterer. The scattered light subsequently hits the receiver the receiver (photodiode) and generates a measurable electric signal. The combination of a forward-and-backward scatterer facilitates optimum detection, as well as differentiates between light-and-dark particles / particle size.

This type of detection creates standardized, responsive behavior, therefore optimizing the differentiation between wanted signals and deceptive phenomena. Additionally, the heat sensors make it possible to detect fires without smoke generation.

Additionally, this scenario generates the following advantages:

- ✓ Early detection of all fire types of fire – whether they generate light-or-dark smoke, or no smoke
- ✓ The fire detector can be operated at a lower sensitivity level, thus achieving a higher immunity against false alarms that may otherwise be caused by cold aerosols (e.g. – by smoking, electrical welding, etc.).

  In the case of an open fire, the smoke sensitivity is heightened by a temperature increase — which means that a detection-reliability level that is comparable to a wide-spectrum smoke detector — can be achieved and maintained.

Operation – (continued)

Field-Device Programmer / Test Unit

Every Model FDOOT441 intelligent detection device is compatible with the Siemens field-device programmer / test unit (Model DPU | 8720), which is a compact, portable and 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 | 8720 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 | 8720 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 | 8720, there is no longer a cause for concern with any vibration, corrosion and other deteriorating conditions that can accompany the vitality of a mechanical-addressing mechanism.

Field-selectable application profiles

Model FDOOT441 provides 22 user-friendly, field-selectable application profiles, identified with universally known names (e.g. — hotel | Telco | office | parking garage | dormitory | data center, etc.) Refer to installation manual: **P/N – A6V10324655** for a complete list and description of application profiles.

Due to generic-name classifications, no cross-reference tables are required as the application name resides in the panel's configuration tool. This user-friendly feature — along with the algorithms provided by **ASA***technology* — provides a reliable, field-configurable detector suitable for an array of applications.

Field-selectable temperature settings

Model FDOOT441 provides five (5) field-selectable temperature thresholds, ranging from 135°F to 175°F (57°C to 79°C), with fixed and rate-of-rise options. These ranges provide maximum flexibility to program and to easily adjust the temperature settings that suit multi-application needs with a building or in changing environmental conditions.

Additionally, Model FDOOT441 can be configured to provide a low-temperature warning signal at 40°F (4.4°C). This configuration (along with connection to a compatible fire-alarm control panel [FACP]) meets NFPA 72 requirements for sprinkler-temperature monitoring, and serves to prevent water freezing inside pipes, relative to water-based suppression systems.

Ambient supervisory feature for temperature-threshold ranges

Another highlight for Model FDOOT441 is supervision of ambient temperatures, allowing the end user to set a specified, unique warning point at a customized temperature threshold ranging from 4°F to 120°F (-20°C to 49 °C). This feature is practical for monitoring of machinery; special processes, or for environments where maintaining a temperature is critical as an early-warning supervisory signal.

Self-monitoring for smoke-sensor sensitivity

Model FDOOT441 provides an automatic, self-monitoring sensitivity check that complies with the NFPA 72 sensitivity requirements. When connected with a compatible FACP, it provides automatic, dynamic sensitivity verification within the agency-listed-and-approved limits. Besides checking for sensor integrity and automatic environmental compensation, Model FDOOT441 provides a display and report of sensitivity in percent-per-foot (or percent-per-meter) at the FACP.

Profile Overview

Each Model FDOOT441 intelligent detector contains one (1) 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 in its sensing chamber
- Smoke sensitivity is within the range indicated on the nameplate label
- Internal sensors and electronics

Operation – (continued)

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.

A quick and easy visual inspection of the detector can be done at any time since the appropriate color is displayed via the LED indicator found on the detector's faceplate.

Installation

All Model FDOOT441 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 decorative plugs to cover the outer mounting-screw holes.

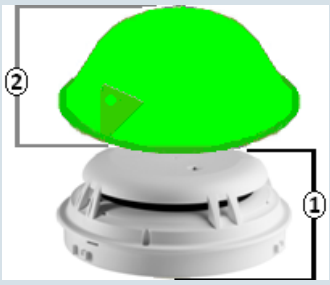
Model 00941 may be installed on the same initiating circuit with the Siemens Model `H'-series detectors [when used with Desigo Fire Safety FACPs] –

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

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

- Dust-resistant photoelectric chamber
- Solid-state, non-mechanical thermal sensor
- Microprocessor-based electronics with a low-profile plastic housing

1. **Model FDOOT441 addressable detector**
2. **Protective dust cover (included)**



All Model FDOOT441 intelligent detectors are approved for operation with the Underwriters' Laboratories-specified temperature range of 32° to 120° (0° to 49°C) – depending on heat-detector configuration (see: installation manual **P/N – A6V10324655** for further details).

Application Data

Installation of Model FDOOT441 detectors requires 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 FDOOT441 is polarity insensitive, which can greatly reduce installation and debugging times.

Model FDOOT441 fire detectors can be applied within the maximum 30-feet 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 joists 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 – Fire Safety distributor or sales office whenever you need assistance applying Model FDOOT441 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.

Technical Data

Operating Temperature:	+32° – +120°F (0° – +49°C)
Heat Detector Range:	+135° – +175°F (+57° – +79°C)
Programmable Supervisory Temperature Warning:	-4° – +120°F (-20° – +49°C) (available with compatible FACPs)
Detector Sensitivity Range:	UL Listed: 0.77% to 3.82% / feet NFPA 76 (Telco) VEWFD: 0.2% / feet *Pre-alarm*; 1.0% / feet *Alarm*
Air Velocity: Open Area: Direct-in-duct:	 0 – 4,000 feet-per-minute (fpm) 0 – 4,000 fpm
Air Pressure:	No effect
Application Profiles:	22 (field-configurable)
Relative Humidity:	0 – 95% (non-condensing)

Thermal Ratings

Field-Selectable Temperature Profiles	
Fixed Temperature:	135°F (57.2°C)
	145°F (62.8°C)
	155°F (68.3°C)
	165°F (73.9°C)
	175°F (79.4°C)
Fixed Temperature + Rate-of-Rise: (R-o-R)	135°F (57.2°C) + R-o-R, 15°F (-9.4°C)
	175°F (79.4°C) + R-o-R, 15°F (-9.4°C)
	135°F (57.2°C) + R-o-R, 20°F (-6.6°C)
	175°F (79.4°C) + R-o-R, 20°F (-6.6°C)

Field-Selectable Alarm-Threshold Profiles	
Threshold:	2.5% / feet
	3.0% / feet
Threshold, Verified:	2.5% / feet
	3.0% / feet

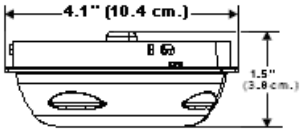
Approvals | Standards

Factory Mutual (FM)	3210, 3230
California State Fire Marshal (CSFM)	7272-0067:0260
Underwriters Laboratores (UL | ULC)	UL268
	UL268A
	UL521
	ULC-S524
National Fire Protection Agency	NFPA 25
	NFPA 72
	NFPA 76

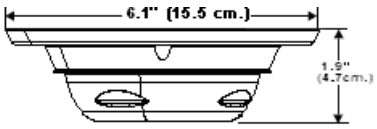
Electrical Ratings

Input Voltage Range:	13 – 32 VDC
***Alarm* Current:**	650 µA, max.
Standby Current: (quiescent)	

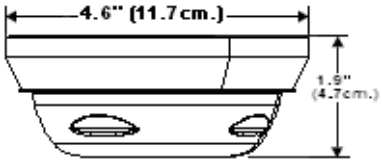
Mounting Diagrams | Dimensions



Model FDOOT441



Model FDOOT441
[with Model DB-11 detector base]



Model FDOOT441
[with Model DB-11E detector base]

Details for Ordering

Model or Type	Part Number	Product
FDOOT441	S54320-F7-A1	Multi-Criteria Fire Detector with ASA*technology*™
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
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

Product Compatibilities

Model or Type	Data Sheet	Panel
XLS	6300	FireFinder (fire)
XLSV	6340	FireFinder (fire w/ voice)
FC2005	6813	Desigo Fire Safety 50-point addressable
FC2025	6815	Desigo Fire Safety 252-point addressable (fire)
FC2050		Desigo Fire Safety 504-point addressable (fire)
FV2025	6821	Desigo Fire Safety 252-point addressable (fire w/ Intelligent Voice Communication [IVC])
FV2050		Desigo Fire Safety 504-point addressable (fire w/ Intelligent Voice Communication [IVC])

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

Desigo® Fire Safety

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