Electrical Signaling

Electrical protective signaling systems are configurations of components used to produce alarm signals indicative of fire, smoke, sprinkler waterflow or other emergency and to produce supervisory signals indicative of conditions needing attention with respect to protection equipment or watch service. System configurations are classified according to where and how the signals are received. The categories are commonly designated as local, municipal, remote station, proprietary, emergency voice/alarm communication, emergency communication, and central station. Auxiliary systems are either local or proprietary systems interconnected with a municipal system.

This category presents the major system component categories and the integrated system configurations. The selection of components to form a hybrid system should be made only by those skilled in system design. Also, the suitability of any system application should be judged on the basis of the hazard(s) being protected.

Alarm Signal Initiating Devices

Alarm signals are initiated either automatically or manually. Automatic detectors respond to changes in characteristic phenomena associated with fire or other emergency conditions.

Fire Detection, Smoke-Actuated

FM Approved smoke actuated devices respond to airborne particulate products of combustion.
The photoelectric principle is based on the change in current which accompanies a change in light intensity on a photoelectric cell as a result of smoke entering the detector.
The beam type version has the light source and photoelectric cell separated in the protected area.
The ionization type detector ionizes the air in special chambers within the detector.
Particles entering the exposed chamber decrease the normal ionization current.
Air-sampling detectors have ambient air drawn from the protected area into a chamber containing the sensing element.
Air duct smoke detectors are for the primary purpose of controlling blowers and dampers of air conditioning and ventilating systems to prevent distribution of smoke and gaseous products;
they should not be used as a substitute for open area detection.
Unless otherwise indicated in the listing, the permissible air velocity range for duct type detectors is 250 to 1500 ft/min (75 to 455 m/min) and up to 300 ft/min (90 m/min) for open area detectors.
A "smoke switch" is fail-safe in that loss of power to the device causes the same switching operation as when smoke is detected.
Average coverage should not exceed 900 ft2 (84 m2) per detector. Reduced coverage is recommended beneath high ceilings and for high air flow areas such as computer rooms.
These devices are suitable for use in ambients of 32°-100°F (0°-38°C) unless otherwise indicated in the listing. Installation, testing, and maintenance by trained personnel are recommended.

Very Early Warning Fire Detection (VEWFD) Systems

Very Early Warning Fire Detection (VEWFD) Systems are high sensitivity smoke detectors (air-sampling or spot type) that are specifically designed and tested to detect low-energy fires before the fire conditions threaten data processing and/or telecommunications service. These devices have been tested in accordance with criteria outlined in National Fire Protection Association (NFPA) 76, Fire Protection of Telecommunications Facilities.

Design these fire detection systems to provide detection within the occupancy-specific recommendations described in FM Global Property Loss Prevention Data Sheet Numbers 5-14, Telecommunications and 5-32, Data Centers and Related Facilities.

In addition, these detectors are intended to be installed in accordance with the manufacturer's installation instructions, ANSI/NFPA 72, The National Fire Alarm Code, NFPA 75 Fire Protection of Information Technology Equipment, NFPA 76, Fire Protection of Telecommunications Facilities and in a manner acceptable to the local Authority Having Jurisdiction. Other NFPA Standards may apply, such as those covering protection system applications.

The minimum sensitivity levels of a VEWFD systems (air-sampling or spot type) above ambient air-born levels shall be:

- Alert condition – 0.62%/m (0.2%/ft) obscuration (effective sensitivity at each port or spot)
- Alarm condition – 3.1%/m (1.0%/ft) obscuration (effective sensitivity at each port or spot)

High sensitivity detection also requires special detector spacing guidelines that differ from typical open area protection and outlined below:

- With a single level of protection, max. coverage are not to exceed 18.6m2 (200ft^2)
- With a double layer of protection (high and low), max. coverage are not to exceed 137.2m2 (400ft^2)

Other spacing restrictions might apply (e.g. return air, maximum air flow from ventilation, aisle containment systems, etc.). These devices are suitable for use in ambients of 32°-100°F (0°-38°C) unless otherwise indicated in the listing. Installation, testing, and maintenance by trained personnel are recommended.

Model SZA-NA(FM) High Sensitivity Smoke Detection System

Model SZA-NA(FM) High Sensitivity Smoke Detection System (air sampling HSSD) for use with compatible Approved fire alarm controls having separate circuits for alarm signaling and for power. Software MCPU Version 1.1 and SCPU Version 1.0. The model SZA-NA(FM) detection system consists of a PVC plastic network connected with laser smoke detection unit, air flow sensor, air intake sampling fan, power supply, motherboard and programming board, 7 segment display, combination of metal and plastic enclosure. SZA-NA(FM) detection system operates from 19.4V dc to 29V dc input voltage, 0.5 Apm max current. The alarm sensitivity of the SZA-NA(FM) detection system ranges from 0.005%/m (0.0017%/ft) to 5%/m (1.67%/ft) within four sensitivity levels. The SZA-NA(FM) detection system is suitable for indoor use only in ambient temperatures of -10°C to 50°C (14°F to 122°F). The three alarm and one trouble NO/NC relays have 24V dc and 0.5 Amp contact ratings.

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