FIRECOM™

Technology Protecting Life®

F900-550

Addressable Ionization Smoke Detector

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Description

The F900-550 Addressable Ionization Smoke Detector has a molded self-extinguishing white polycarbonate case with wind resistant smoke inlets. Stainless steel wiper contacts connect the detector to the terminals in the mounting base. Inside the detector case is a printed circuit board which has the ionization chamber system mounted on one side and the address capture, signal processing and communications electronics on the other.

The ionization chamber system comprises an inner reference chamber inside an outer sensing chamber **(Fig. 1)**. The outer sensing chamber has smoke inlet apertures which are fitted with an insect resistant mesh.

The radioactive source holder and the outer smoke chamber are the positive and negative electrodes respectively. A single Americium 241 radioactive source mounted within the inner reference chamber irradiates air in both chambers to produce positive and negative ions. On applying a voltage across the electrodes an electric field is formed as shown in **Fig. 2**. The ions are attracted to the electrode of the opposite sign, some ions collide and recombine, but the net result is that a small electric current flows between the electrodes. At the junction between the reference and smoke chambers is the sensing electrode which is used to convert variations in the chamber currents into a voltage.

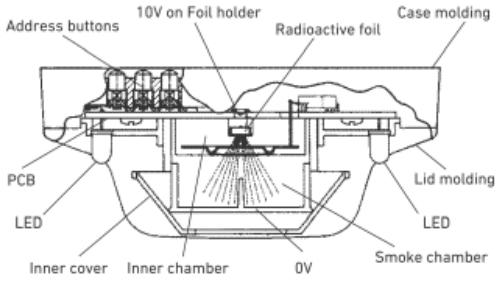

Fig. 1 *Sectional View - F900-550 Addressable Ionization Smoke Detector*

When smoke particles enter the ionization chamber ions become attached to them with the result that the current flowing through the ionization chamber decreases. This effect is greater in the sensing chamber than in the reference chamber and the imbalance causes the voltage on the sensing electrode to go more positive.

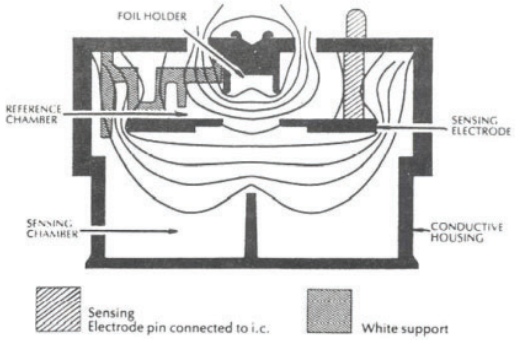

Fig. 2 *Diagram showing lines of equipotential for the F900-550 Addressable Ionization Smoke Detector*

The voltage on the sensing electrode is monitored by the sensor electronics and is processed to produce a signal that is translated by the A/D converter in the communications ASIC ready for transmission when the device is interrogated.

Approvals and Listings

Underwriters Laboratories (File No. S6349)
NYC MEA (MEA No. 32-95-E)
California State Fire Marshal (7271-1496:120)
City of Chicago

FIRECOM™, INC.
39-27 59th Street
Woodside, NY 11377
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718.899.1932 FAX

Electrical Description

The F900-550 detector is designed to be connected to a two wire loop circuit carrying both data and a 17 to 28 VDC supply. The detector is connected to the incoming and outgoing supply via terminals L1 and L2 in the mounting base. A remote LED indicator requiring not more than 4mA at 5V may be connected between the R+ and R- terminals.

When the device is energized the communications and processing ASIC regulates the flow of power and controls the data processing. The ionization chambers are energized and the ultra low leakage sensor ASIC provides a conditioned analog signal to the analog to digital (A/D) converter within the communications and processing ASIC. When smoke enters the ionization chambers through the integral gauze, the voltage at the sensing electrode increases to produce an analog signal. An A/D conversion of the signal from the ionization chambers is carried out once per second or when either the monitor or the preceding address is being interrogated. Whenever the device is interrogated this data is sent to the control equipment.

The detector is calibrated to an analog value of 25±7 counts in clean air. This value increases with smoke density. Counts of 8 or less indicate fault conditions.

Electrical Specifications

Detector Type:
Products of combustion (smoke).

Detection Principle:
Ionization chamber.

Chamber configuration:
Twin compensating chambers using one single sided ionising radiation source.

Smoke Sampling Frequency:
Continuous.

Supply Wiring:
Two wire supply.

Terminal Functions:
L1 and L2; supply in and out connections
+R; remote indicator positive connection (internal 2KΩ resistance to supply +ve).
-R; remote indicator negative connection (internal 2KΩ resistance to supply –ve).

Supply Voltage:
17 to 28 Volts dc.

Modulation Voltage at Monitor:
5 to 9 Volts peak to peak.

Quiescent Current:
280µA.

Power-up Surge Current:
1mA.

Normal Surge Current:
(synchronized to ADC operation)
500µA.

Duration of power-up Surge Current:
0.3 seconds.

Maximum power-up time:
(measured from application of power and protocol)
4 seconds for communications.

Operating Temperature:
0ºC to 49ºC.

Alarm Indicator:
Red light emitting diode (LED).

Alarm LED Current:
2mA.

Remote LED Current:
4mA at 5V (measured across remote load).

Humidity:
(no condensation)
0% to 95% relative humidity.

Wind Speed:
10m/s maximum.

Atmospheric Pressure:
Automatic compensation by dual chambers to maintain sensitivity up to a height of 2000m.

Dimensions:
Monitor: 4 in x 1.65 in (diameter x height)

Weight:
3.0 oz.

Materials:
Housing: White polycarbonate V-O rated to UL 94.
Terminals: Stainless Steel, nickel plated.

Ordering Information

Model No.	Part No.	Description
F900-550	75003	Addressable Ionization Smoke Detector

It is our intention to keep the product information up to date and accurate. We cannot cover all specific applications or anticipate all requirements. All specifications are subject to change without notice. For more information contact: FIRECOM, INC.

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