



IONIZATION SMOKE DETECTORS FOR SYSTEMS APPLICATIONS

MODEL
1800

BRK ELECTRONICS *First in Fire Warning*



1800 Series 2 Wire Systems Detectors

- Compact, Stylish Design
- Stable Unipolar Ionization Sensing Chamber
- Designed For Direct Surface or Electrical Box Mounting

- **Unique Unipolar Dual Chamber Sensor**
 - Provides Exceptional Stability
 - 1.5% Nominal Sensitivity
 - Wind Gusts up to 2500 Feet per Minute will not cause False Alarms
- **Built-in Test Switch**
- **Visual Alarm Indication**
- **Twist On Mounting Bracket with Tamper Option**

- 10 to 32 VDC Operating Range
- Convenient Terminal Strip Wiring
- 2 Wire Supervised Circuits
- Remote LED Option
- Low Standby Current
- Listed to UL 268

BRK's 1800 series has been designed to meet the demanding performance requirements of UL's new standard 268. Among the most significant differences between this standard and those that it replaces (167) and (168), is the addition of a slow smoldering fire test. The conventional (bipolar) ionization type smoke detector, while extremely responsive to the fast flaming fires, is sluggish in responding to slow smoldering fires, and therefore to meet UL268, must be set to a more sensitive level than previously required (see fig. 1).

BRK's 1800 series features a new UNIPOLAR sensing chamber, which responds uniformly to the broad range of fire tests required by UL268 (see page 2 for detailed information on unipolar technology).

When set to the same sensitivity, the 1800's unipolar chamber is approximately 2 times more sensitive to smoke than conventional bipolar chambers with comparable smoke entry characteristics. Therefore it can be set **LESS SENSITIVE** than bipolar detectors, and further from the threshold of alarm (1.5% nominal) and still will alarm at the levels of smoke required by this demanding new standard. In order to pass these new requirements most competitive units are commonly set below 1% sensitivity, and therefore may be more susceptible to nuisance alarms.

The 1800 series are system type products of combustion detectors designed for use with two-wire UL Listed control panels. Drawing less than 100 microamps during normal operation, the detectors can operate over a broad voltage range of 10 to 32 VDC. The dual chamber unipolar ionization sensor detects both visible and invisible smoke. The sensitivity of the 1800 is preset at the factory and does not require adjustment in the field. A solid state voltage regulator maintains detector sensitivity over a wide range of input voltages. A visual indication of an alarm is given by an LED on the detector cover. The visible alarm signal may be

DETECTOR RESPONSE TO
SMOLDERING FIRES
Unipolar vs. Bipolar

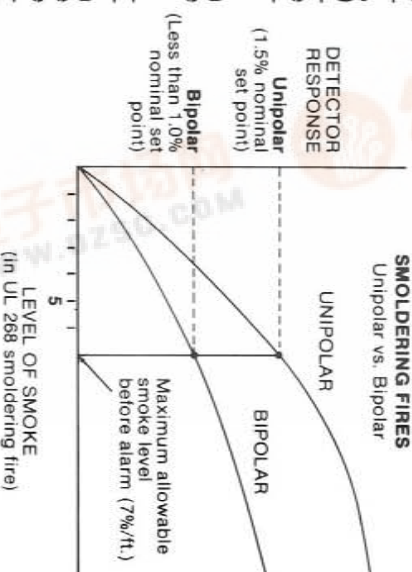
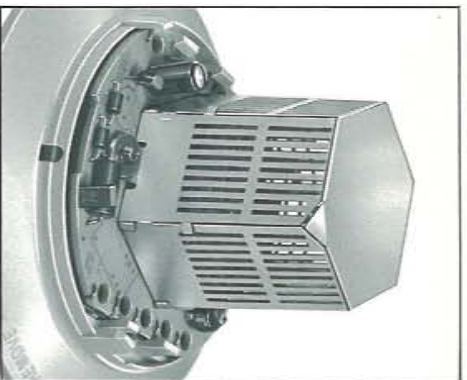


Figure 1

removed by using BRK's 669 series remote alarm lamp assemblies. Incorporated within the detector is a sensitivity test switch which makes troubleshooting easy without sophisticated test equipment. Field wiring connects to easy-to-wire terminals, simplifying installation. Easy to install, clean and maintain, this detector is designed for direct surface mounting (mounting bracket included), or mounting to a 4" octagon or smaller box. For installation and maintenance instructions, see the 156-127-XX Manual and the 156-210-XX "Applications Manual for System Detectors" for location and placement of the detectors.



BRK's new unipolar ionization chamber

Stable response to a broader range of fires!

A unipolar dual chamber ionization sensor is more sensitive to slow smoldering fires than a conventional bipolar sensor and yet is less susceptible to nuisance alarms. Like a bipolar sensor, a unipolar sensor is able to detect a change in the chamber ion current caused by the presence of combustion particles. These particles act as recombination centers, increase resistance across the chamber and reduce current flow (see figure 2). Unlike a bipolar sensor, a unipolar sensor (see figure 3) accentuates the increase in resistance by speeding the rate of ion recombination. The recombination rate is speeded because the unipolar field, weakens the bi-

polar allowing for easier ion recombination (See figure 3). Tests have shown that unipolar sensors are approximately twice as sensitive as bipolar chambers in terms of chamber signal change to increasing levels of smoke (see figure 4).

Furthermore, because its response is not significantly affected by size or number of smoke particles, the unipolar's response does not decrease in a slow smoldering fire as much as a bipolar detector. Thus, its sensitivity does not have to be increased (moved closer to the threshold of alarm) to pass UL268's smoldering fire test.

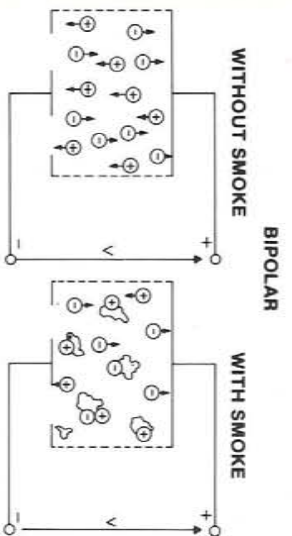


Fig. 2. Influence of smoke particles on the current in a bipolar ionization chamber. Equal number of + and - ions, ions recombine on smoke particles and reduce current flow.

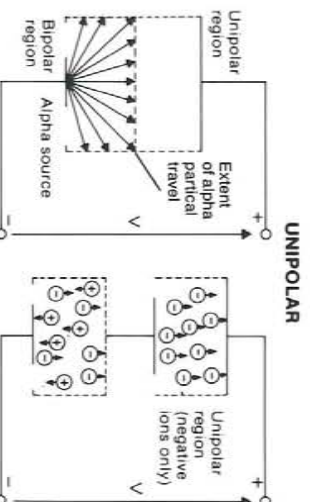


Fig. 3. Unipolar chamber is larger than bipolar chamber, with one plate positioned beyond the distance traveled by alpha particles.

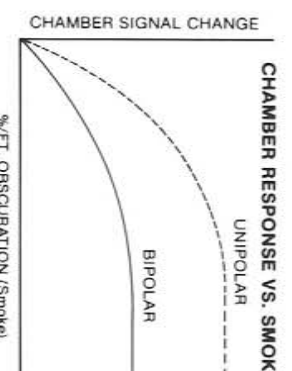
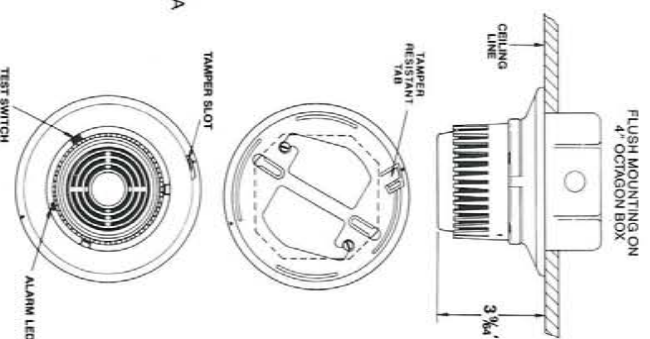


Fig. 4. A Unipolar chamber is approximately twice as responsive as a bipolar chamber. Thus, it will provide a larger signal swing for a given level of smoke.

1800 Series dual chamber ionization, dual source, dual chamber, unipolar, dual

Specifications	1800
Control Panel Applications:	2-wire
Visual LED Local Alarm	X
Remote LED Annunciator Capability	X
Operating Voltage Range:	10-32V DC Avg.
Current Limits:	
a) Standby (typ.)	100µA@24V
b) Alarm Current (typ.)	Note 1
c) Alarm Current (max.)	Note 1
Alarm Signal:	Shunt on power leads

NOTE
1. Two-wire control panels must limit current to 300mA or less.



Architectural/Engineering specifications

The detector shall have a dual chamber ionization sensor of the unipolar type. The sensor shall have a nominal sensitivity of 1.5% ft. as measured in a UL smoke box. It shall be possible to perform a calibrated sensitivity and performance test on the detector without the need of generating smoke. The test method shall test all detector circuits.

The detector shall incorporate a solid state voltage regulator which can maintain detection sensitivity over an input voltage range of 10-32 VDC. Standby current shall be no more than 100 microamps. Current limiting shall protect the detector against power surges and noise protector circuitry shall protect the detector so it can be wired without conduit, where codes allow.

The detector shall have a mounting bracket that allows for direct surface mounting or mounting to a 4" octagon box. A visual indication of an alarm shall be provided by a latching light emitting diode (LED) on the detector which may be seen at ground level. The visible alarm signal shall be capable of remote LED annunciation.

A special test meter shall be available to precisely check the calibration and sensitivity of the detector. Metering points for the test meter shall be accessible on the exterior of the detector.

The detector shall not alarm when exposed to wind velocities up to 2500 feet per minute. The detector's sensing chamber shall incorporate less than one microcurie of AM241.

HOW TO ORDER — 1800 — Ionization Detector, 2 Wire, Surface Mount.

156-210-XX — Applications Manual for Systems Detectors.

A77-669-00 — Remote Alarm Lamp (LED) Assembly With Rectangular Mounting Plate.

TM-80 — Test Meter for Field Check of Voltage and Sensitivity Levels.

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