| Series 65 Standard Ionisation Smoke Detector | ▲ Part nos |
|---|---|
| Ionisation detector | 55000-217 |
| Detector with flashing LED | 55000-216 |
| Detector with magnetic test switch & flashing LED | 55000-215 |
| **Series 65 Integrating Ionisation Smoke Detector** | |
| Ionisation detector | 55000-220 |
| Detector with flashing LED | 55000-219 |
| Detector with magnetic test switch & flashing LED | 55000-218 |

page 4

## OPERATING PRINCIPLES

The detector has a moulded self-extinguishing white polycarbonate case with wind resistant smoke inlets. Nickel plated stainless steel wiper contacts connect the detector to the base.

Inside the detector case a printed circuit board has the ionisation chamber mounted on one side and the signal processing electronics on the other.

The ionisation chamber consists of a reference chamber contained inside a smoke chamber (Fig. 1). The outer smoke chamber has inlet apertures fitted with insect resistant mesh. The radioactive source holder and smoke chamber form positive and negative electrodes respectively.

An Americium 241 radioactive source mounted within the reference chamber irradiates the air in both chambers, producing positive and negative ions. A voltage across the electrodes produces an electric field.

Ions are attracted to the electrode of the opposite sign to their own charge. Many recombine but a small electric current flows between the electrodes. At the junction between reference and smoke chambers the sensing electrode converts variations in chamber current into voltage changes.

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

The voltage at the sensing electrode is fed to a comparator where it is compared with a factory-set clean air reference voltage. If the monitored voltage exceeds the reference voltage, the comparator switches the alarm latch on, increasing the current drawn from the supply from about 40µA to a maximum of 75mA. This fall in the impedance of the detector is recognised by the control panel as an alarm signal.

The alarm latch current also illuminates the detector integral LED. A remote indicator connected between the L1 IN terminal and the –R terminal will have a voltage equal to the supply voltage less 1 volt across it and so will illuminate. See page 17 for details of the remote indicator.

To ensure correct operation of the detector the control panel must be arranged to supply a maximum of 33 volts DC and a minimum of 9 volts DC in normal operation.

The supply may fall to 6 volts DC in alarm conditions if a supply current of at least 10mA is available at this voltage. To ensure effective illumination of the integral LED and any remote indicator, the supply to the detector should exceed 12 volts.

To restore the detector to quiescent condition, it is necessary to expel any smoke and interrupt the electrical supply to the detector for a minimum of one second.

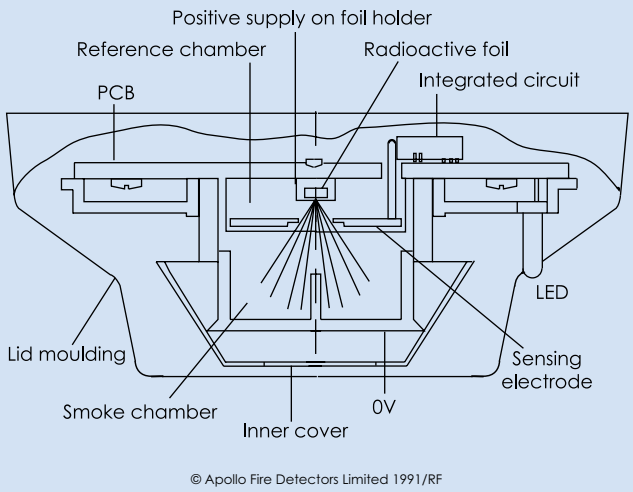


**Fig.1** Side view, Series 65 Ionisation Smoke Detector

## INTEGRATING VERSION

Circuitry in the Integrating Ionisation Smoke Detector protects against transient levels of smoke above the normal threshold level for 10 to 20 seconds. The sensitivity of the detector is not affected by this modification.

## OPTIONS

(Apply to standard and integrating versions)

1. Flashing LED: The alarm indicating LED flashes when the detector is in a quiescent state.
2. Magnetic test switch and Flashing LED: A magnetic test switch in the circuit of the detector can be magnetically activated from outside the case to initiate an alarm condition for test and commissioning purposes. A flashing LED, as outlined above, is also included.

## SAFETY NOTE

In the United Kingdom, ionisation smoke detectors are subject to the requirements of the Radioactive Substances Act 1993 and to the Ionising Radiations Regulations 1999 made under the provisions of the Health and Safety at Work Act 1974.

The detectors, independently tested by the National Radiological Protection Board (NRPB), conform to all the requirements specified in the 'Recommendations for ionisation smoke detectors in implemetation of radiation standards' published by the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (OECD) 1977.

There is no limit to the number of ionisation smoke detectors which may be installed in any fire protection system within the United Kingdom. See Certificate of Approval no. TA1 issued by the Health & Safety Executive for further details.

Storage regulations depend on local standards and legislation, but, in the UK, the number of ionisation smoke detectors in any building or premises shall be less than 500. See Certificate of Approval no. TA3 of 1999 issued by the Health & Safety Executive for further details.

At the end of their recommended working life of ten years, ionisation smoke detectors should be returned to Apollo for safe disposal or disposed of in an otherwise locally approved and environmentally safe manner. Please see "A guide to the care, maintenance and servicing of Apollo products", PP2055.

Guidance on storage and handling can be given by Apollo Fire Detectors and full details can be requested from:

Radioactive Substances
Regulation Function
Environment Agency
Rio House
Waterside Drive
Aztec West, Almondsbury
Bristol BS32 4UD

Outside the UK, please contact the relevant national agency.

## ENVIRONMENTAL CHARACTERISTICS

Series 65 ionisation smoke detectors operate over a temperature range of –20°C to +60°C.

Ionisation detectors have some sensitivity to air movement (wind). The extent to which the sensor output will change depends on the wind speed and on the orientation of the detector relative to the wind direction. Relatively small changes in wind direction can cause significant changes in sensor output.

For wind speeds up to 1m/s (200ft/min) sensitivity will change by less than 20%. Continuous operation in wind speeds greater than 2m/s (400ft/min) is not recommended. However, wind speeds up to 10m/s (2000ft/min) can be tolerated for short periods and will not under any conditions increase the probability of false alarms.

Series 65 ionisation smoke detectors are supplied in individual packing with a red lid serving as a dust cover which can be left in place after fitting to prevent ingress of foreign material until commissioning of the system takes place. At this point the covers must be removed.



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## TECHNICAL DATA

**Specifications are typical and given at 23°C and 50% relative humidity unless specified otherwise.**

**Detector Type:**
Point type smoke detector for fire detection and alarm systems for buildings

**Detection Principle:**
Ionisation chamber

**Chamber Configuration:**
Twin compensating chambers using one single-sided ionising radiation source

**Radioactive Isotope:**
Americium 241

**Activity:**
33.3 k Bq, 0.9 µCi

**Supply Wiring:**
Two wire monitored supply, polarity insensitive

**Terminal Functions:**
L1 IN and L2: supply in connections (polarity insensitive)
L1 OUT and L2:
supply out connections (polarity insensitive).
–R:
remote indicator negative connection

**Supply Voltage:**
9 to 33V DC

**Ripple Voltage:**
2V peak to peak maximum at 0.1Hz to 100kHz

**Quiescent Current:**
20–45µA at 24V

**Switch-on Surge Current:**
110µA

**Alarm Voltage:**
6 to 33V

**Normal Alarm Current:**
61mA at 28V
52mA at 24V
18mA at 10V

**Alarm Indicator:**
Red, Light Emitting Diode (LED)

**Design Alarm Load:**
420Ω in series with a 2V drop

**Holding Voltage:**
6V (min)

**Holding Current:**
10mA (min)

**Minimum Voltage Required to Illuminate Indicator:**
12V

**Alarm Reset Voltage:**
1V

**Alarm Reset Time:**
1 second

**Remote Output Characteristics:**
Remote is a current sink to the negative line limited to 17mA

**Calibration:**
Factory set to ΔV of 0.8V

**Sensitivity:**
Nominal threshold Y value of 0.7 to EN 54–7: 2000

**Temperature Range:**

| | |
|---|---|
| Maximum continuous operating temperature | 60°C |
| Minimum continuous operating temperature | 0°C |
| Minimum operating temperature (no condensation or icing) | –20°C |
| Storage | –30°C to +80°C |

**Temperature Compensation:**
Automatic compensation by dual chambers to comply with EN 54–7: 2000 across the operating temperature range

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

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

**Wind Speed:**
10m/s maximum

**IP Rating:**
23D in accordance with BS EN 60529

**EMC, approvals and regulatory compliance:**
Refer to Page 18 of this document

**Dimensions:** (dia. x height)

| | |
|---|---|
| Detector: | 100x42mm |
| Detector in Base: | 100x50mm |

**Weights:**

| | |
|---|---|
| Detector: | 102g |
| Detector in Base: | 153g |

**Materials:**
Detector housing: White polycarbonate rated V-0 in accordance with UL 94.
Terminals: Nickel plated stainless steel

CE
CE 0832

technical data



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