

# Series 60



**Engineering Product Guide**  
*Ionisation Smoke Detectors*  
*Optical Smoke Detectors*  
*Resettable Heat Detectors*



# SERIES 60 CONVENTIONAL FIRE DETECTORS

Series 60 is a range of conventional fire detectors, designed for the highest effectiveness by utilising the latest technology. The range comprises ionisation, integrating ionisation and optical smoke detectors and a series of combined rate-of-rise and fixed heat detectors.

These detectors have been carefully researched by the Apollo design team and the range has undergone rigorous testing to ensure that it meets not only the European standards but also the demands of today's high-technology environments.

This Product Guide aims to provide engineers with the fullest information on Series 60, in order to be able to design optimum solutions to fire protection problems.

Apollo Fire Detectors Ltd, part of the Halma plc group of companies, operates from one site at Havant, near Portsmouth, England. All departments - Research and Development, Sales and Marketing, Manufacturing and Finance - are located here. Apollo applies the most modern production techniques and has invested in sophisticated manufacturing equipment to ensure consistent high quality of product and fast response to customer requirements. Through planned expansion Apollo has reached a leading position in the market for professional fire detectors and exports over half of its production to countries around the world.

*Information in this guide is given in good faith, but Apollo Fire Detectors Limited cannot be held responsible for any omission or errors. The company reserves the right to change specifications of products at any time and without prior notice.*

Apollo Fire Detectors was one of the first companies in the fire protection industry to be successfully assessed to the standard BS 5750, part 2 (ISO 9002/EN 29002) for quality assurance. In 1999, Apollo gained BS EN ISO: 9001: 1994 certification from the Loss Prevention Certification Board.

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Series 60 Ionisation Smoke Detector

Part no. 55000-200

## SERIES 60 IONISATION SMOKE DETECTOR

### Operating Principles

The Series 60 detector head has a moulded 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 ionisation chamber system mounted on one side and the signal processing electronics on the other.

The ionisation chamber system is an inner reference chamber contained inside an outer smoke chamber (Fig. 1). The outer smoke chamber has smoke inlet apertures which are fitted with an insect resistant mesh.

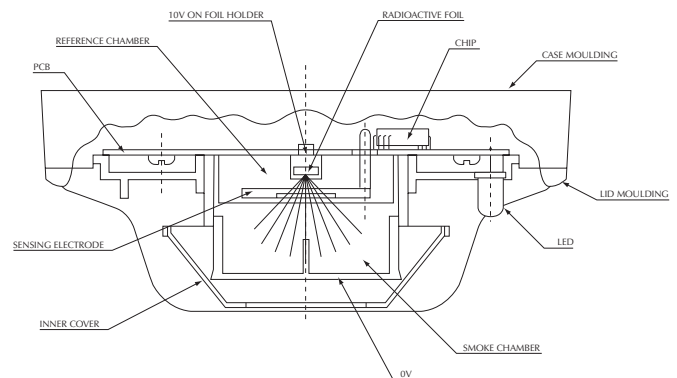
The radioactive source holder and the outer smoke chamber are the positive and negative electrodes respectively. An Americium 241 radioactive source mounted within the inner reference chamber irradiates the air in both chambers to produce positive and negative ions. On applying a voltage across these electrodes an electric field is formed. 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.

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

The voltage on the sensing electrode is monitored by the sensor electronics and is processed to produce a signal which latches the detector into the alarm state when a preset threshold level is reached. At this point the supply current taken by the detector increases by a factor of 1,000.

The ionisation detector is available in standard and integrating versions, each version having the same sensitivity. The integrating version has modified signal processing circuitry which allows an alarm threshold to be present for up to 20 seconds without initiating an alarm. It is most suitable for use in areas where transient high levels of smoke may be expected. The part number for the integrating detector is 55000-210.



**Fig. 1** Sectional View – Series 60 Ionisation Smoke Detector

## Electrical Description

The detector is designed to be connected to a two wire monitored supply of between 17 and 28 volts dc.

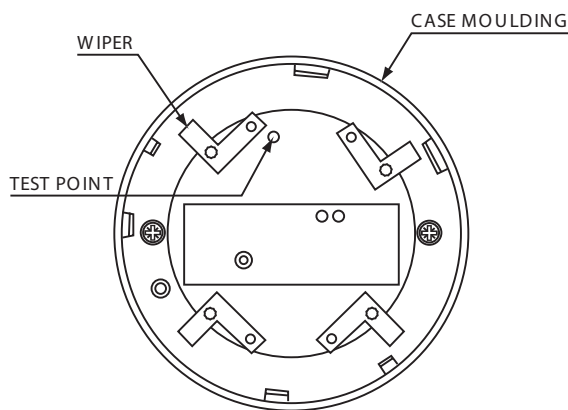
Connection to the supply is made in the mounting base between L1 and L2 and is polarity insensitive. Terminal L1 IN is a supply input terminal and it is connected to Terminal L1 OUT via the detector when fitted. L1 OUT and L2 provide the supply output to the next detector on the zone or to the end of line device. This method of connection permits continuous monitoring of the supply through the detector and the end of line device.

A remote alarm indicator may be connected between the positive supply line and -R terminal. The -R terminal is diode gated to protect it against accidental connection to the negative supply and to permit the connection of more than one detector to a single remote indicator. The current taken through the -R terminal should be externally limited to 23mA. The Apollo remote indicator part no. 53832-070 typically sinks 8mA and is suitable for direct connection between the positive supply and the -R terminals. It is not polarity sensitive and provides constant brightness over the supply range 8 to 28 volts to the detector.

The control unit must be arranged to supply a maximum of 28 volts and a minimum of 6 volts (10mA) in the alarm condition to ensure correct operation of the detector. To ensure effective illumination of the indicator LED the supply to the detector should exceed 12 volts (25 mA).

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

The application of a slowly increasing voltage between the test point (**Fig. 2**) and negative supply line affects the ionisation chambers and causes the voltage at the sensing electrode to rise towards the preset reference voltage. This provides a test facility for use with an Apollo Series 60 test set.



**Fig. 2** Back View – Series 60 Ionisation Smoke Detector.

## Environmental Characteristics

The Series 60 ionisation smoke detector has been designed to operate over the temperature range  $-20^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$  See **Fig 3**.

Continuous wind speeds of up to 2m/s are permitted, and gusts of up to 10m/s can be tolerated without risk of false alarm. It is not recommended that the detector be installed in environments where a constant wind speed of greater than 2m/s is present.

Ionisation detectors can also be affected by variations in atmospheric pressure due, for example, to the differences in height above sea level at which they are installed. Series 60 detectors show very little change in performance at heights up to 2,000 metres above sea level (**Fig 5**).

## Typical Quiescent and Alarm Currents

Detector Status			
Supply Voltage (V)	Quiescent Current ( $\mu\text{A}$ )	Alarm Current (mA)	Alarm (LED Fault) (mA)
28	43	61	54
24	38	52	46
17	32	37	33
10	N/A	18	16
6	N/A	8	7

**Table 1**

## 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 have been independently tested by the National Radiological Protection Board (NRPB) and found to conform to all the requirements specified in the "Recommendations for ionisation chamber smoke detectors in implementation of radiation protection standards" published by the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (OECD) 1977.

In summary, Apollo Series 60 ionisation detectors conform to all the requirements. There is no limit to the quantity that may be installed in any fire protection system. Up to 500 detectors may be stored in any premises, although there are stipulations on storage facilities, if more than 100 ionisation detectors are to be stored in any one building. At the end of their useful life of 10 years Series 60 ionisation smoke detectors should be returned to Apollo for safe disposal.

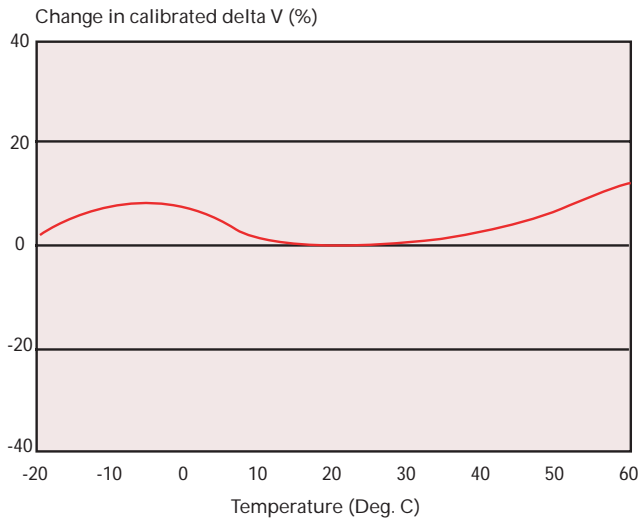
Guidance on storage and handling can be given by Apollo Fire Detectors and full details may be requested from:

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

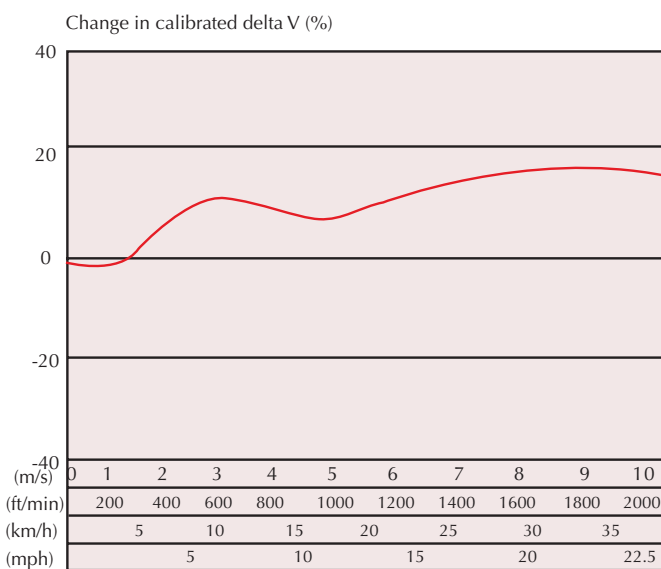
Outside the UK, please contact the relevant agency.

**Note** that Series 60 detectors are supplied in individual packing, with the red lid serving as a dust cover which can be left on the detector after fitting to prevent the ingress of dust and dirt.

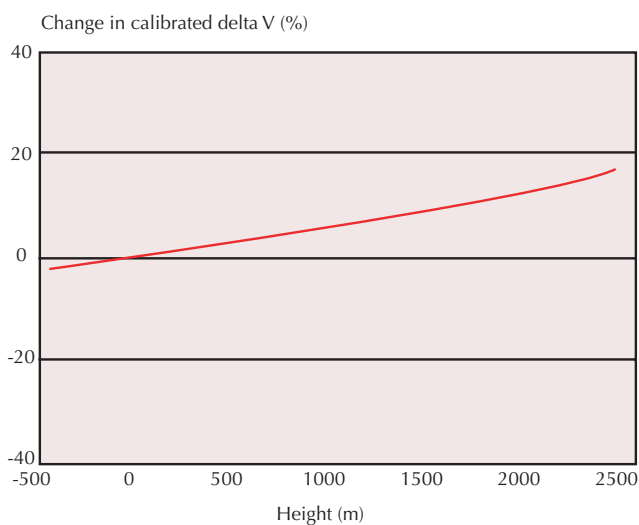
The dust covers must be removed immediately prior to commissioning the system.



**Fig. 3 Typical Temperature Response – Series 60 Ionisation Smoke Detector**



**Fig. 4 Typical Wind Speed Response – Series 60 Ionisation Smoke Detector**



**Fig. 5 Typical Pressure Response – Series 60 Ionisation Smoke Detector**



## Technical Data - Ionisation

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

### **Detector Type:**

Products of combustion (smoke) detector.

### **Detection Principle:**

Ionisation chamber.

### **Chamber Configuration:**

Twin compensating chambers using one single sided ionising radiation source.

### **Radioactive Isotope:**

Americium 241.

### **Activity:**

33.3 k Becquerels, 0.9  $\mu$ Cie.

### **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:**

17 to 28V DC.

### **Ripple Voltage:**

2V peak to peak maximum at 0.1Hz to 100kHz.

### **Quiescent Current:**

30 to 45 $\mu$ A at 24V

### **Switch-on Surge Current:**

80 $\mu$ A

### **Alarm Voltage:**

6 to 28V

### **Normal Alarm Current:**

61mA at 28V

52mA at 24V

18mA at 10V

### **Alarm Indicator:**

Red Light Emitting Diode (LED)

### **Design Alarm Load:**

450 $\Omega$  in series with a 3V drop (LED open circuit).

### **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:**

900 $\Omega$  in series with a 3V drop at 24V with 500 $\Omega$  line impedance gives:

1mA at 9V

4.5mA at 5V

8.0mA at 1V

### **Calibration:**

Factory set to  $\Delta$ V of 1.3V.

### **Sensitivity:**

Nominal threshold Y value of 0.7 to EN54 Part 7 1984; (BS 5445 Part 7 1984).

### **Temperature Range:**

Maximum continuous operating temperature 60°C

Minimum continuous operating temperature 0°C

Minimum operating temperature –20°C  
(no condensation or icing)

### **Temperature Compensation:**

Automatic compensation by dual chambers to comply with EN 54 Part 7 1984; (BS 5445 Part 7 1984) across the operating temperature range.

### **Humidity:**

0% to 95% relative humidity.

### **Atmospheric Pressure:**

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



**Wind Speed:**

2 m/s maximum (constant)  
10 m/s maximum (transient)

**Vibration:**

To EN 54 Part 7 1984 (BS 5445 Part 7 1984).

**Impact:**

To EN 54 Part 7 1984 (BS 5445 Part 7 1984).

**Shock:**

To EN 54 Part 7 1984 (BS 5445 Part 7 1984).

**Static:**

IEC 801-2 (BS 6667 Part 2 1985) Severity Level 3.  
Tested to 12,000V positive and negative to the case and supply terminals from a 250pF capacitor.

**Radiated Emissions:**

BS 6527 Class B.

**Radiated Susceptibility:**

IEC 801 Part 3 Class 3 (10V/m). Tested to 90V/m from 27MHz to 1GHz.

**IP Rating:**

43.

**Dimensions:**

Detector: 100mm x 42mm (diameter x height)  
Detector in Base: 100mm x 50mm (diameter x height)

**Weights:**

Detector: 102 grams.  
Detector in Base: 153 grams.

**Materials:**

Detector housing: White polycarbonate V-O rated to UL 94.  
Terminals: Stainless steel.



Series 60 Optical Smoke Detector

Part no. 55000-300

## SERIES 60 OPTICAL SMOKE DETECTOR

### Operating Principles

The Series 60 optical smoke detector comprises a sensing chamber and a printed circuit board within a white polycarbonate housing.

The sensing chamber is a black moulding configured as a labyrinth which prevents ambient light penetrating into the chamber. The labyrinth has a fine gauze cover to prevent insects from migrating into the chamber.

Within the chamber is an optical arrangement consisting of two main parts: an infra-red light emitting diode and a photo-diode (**Fig. 6**). The LED is positioned at an obtuse angle to the photo-diode, which has an integral daylight filter for further protection against ambient light.

The LED emits a burst of collimated light every 10 seconds. In clean air conditions the photo-diode will not receive light particles – photons – due to the collimation of the light and the angle at which the light is travelling relative to the photo-diode.

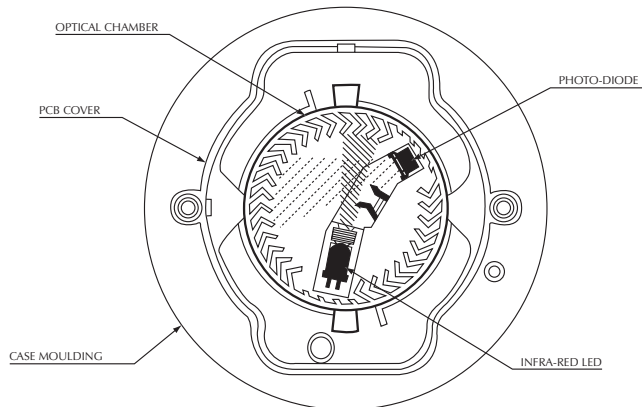
When smoke enters the chamber, it scatters photons onto the photo-diode to excite it into activity. The LED then emits two further bursts of light, this time at 2-second intervals. If light is scattered onto the photo-diode on both these pulses – due to the presence of smoke – the detector will change to the





alarm state when a silicon controlled rectifier on the printed circuit board is switched on and the current drawn by the detector is increased from an average of 40 microamps to a maximum of 61 milliamps.

To ensure maximum reliability, the LED emits light modulated at about 3kHz and the photo-diode will react only on receiving light at this frequency.



**Fig. 6** Top Section – Series 60 Optical Smoke Detector

## Electrical Description

The detector is designed to be connected to a two wire monitored supply of between 17 and 28 volts dc.

Connection to the supply is made in the mounting base between L1 and L2 and is polarity insensitive. Terminal L1 IN is a supply input terminal and it is connected to Terminal L1 OUT via the detector when fitted. L1 OUT and L2 provide the supply output to the next detector on the zone or to the end of the line device. This method of connection permits continuous monitoring of the supply through the detector and the end of line device.

A remote alarm indicator may be connected between the positive supply line and the –R terminal. The –R terminal is diode gated to protect it against accidental connection to the negative supply and to permit the connection of more than one detector to a single remote indicator. The current taken through the –R terminal should be externally limited to 23 mA. The Apollo remote indicator part no. 53832-070 typically sinks 8mA and is suitable for direct connection between the positive supply and the –R terminals. It is not polarity

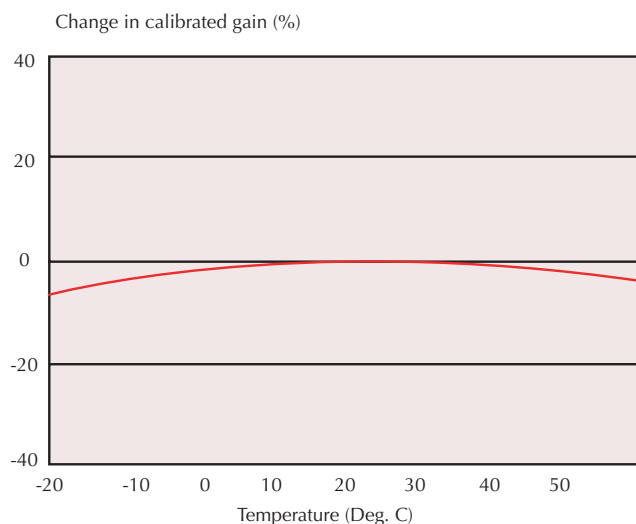
sensitive and provides constant brightness over the supply range 8 to 28 volts to the detector.

The control unit must be arranged to supply a maximum of 28 volts and a minimum of 6 volts (10 mA) in the alarm condition for correct operation of the detector. To ensure effective illumination of the indicator LED the supply to the detector should exceed 12 volts (25 mA).

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

## Environmental Characteristics

The Series 60 optical smoke detector is unaffected by wind or pressure and operates over the temperature range –20°C to 60°C (**Fig. 7**).



**Fig. 7** Typical Temperature Response – Series 60 Optical Smoke Detector

## Technical Data - Optical

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

### **Detector type:**

Products of combustion (smoke) detector.

### **Detector Principle:**

Photo-electric detection of light scattered in a forward direction by smoke particles.

### **Chamber Configuration:**

Horizontal optical bench housing an infra-red emitter and sensor arranged radially to detect forward scattered light.

### **Sensor:**

Silicon PIN photo-diode.

### **Emitter:**

GaAs Infra-red light emitting diode.

### **Sampling Frequency:**

Once every 10 seconds.

### **Confirmation Frequency:**

Once every 2 seconds.

### **Number of Consecutive Sensed Alarm Signals Needed To Trigger Detector Alarm:**

3.

### **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:**

17 to 28V DC.

### **Ripple Voltage:**

2V peak to peak maximum at 0.1Hz to 100kHz.

### **Quiescent Current:**

30 to 45µA at 24V.

### **Switch on Surge Current:**

90µA at 24V.

### **Alarm Voltage:**

6 to 28V.

### **Normal Alarm Current:**

61 mA at 28V.

52 mA at 24V.

18 mA at 10V.

### **Alarm Indicator:**

Clear Light Emitting Diode (LED) emitting red light.

### **Design Alarm Load:**

450Ω in series with 3V drop (LED open circuit).

### **Holding Voltage:**

6V (min).

### **Holding Current:**

10mA (min).

### **Minimum Voltage Required to Light Alarm Indicator:**

12V.

### **Alarm Reset Voltage:**

1V.

### **Alarm Reset Time:**

1 second.

### **Remote Output Characteristics:**

900Ω in series with a 3V drop at 24V with 500Ω line impedance gives:

1mA at 9V

4.5mA at 5V

8.0mA at 1V

### **Sensitivity:**

Nominal threshold of 3.0% light grey smoke obscuration per metre to EN 54 Part 7 1984; (BS 5445 Part 7 1984).

### **Temperature Range:**

-20° to +60°C (no condensation or icing).

### **Temperature Compensation:**

Negative temperature coefficient thermistor.

### **Humidity:**

0% to 95% relative humidity (no condensation)

### **Wind Speed:**

Insensitive to wind.

**Atmospheric Pressure:**

Insensitive to atmospheric pressure.

**Vibration:**

To EN 54 Part 7 1984 (BS 5445 Part 7 1984).

**Impact:**

To EN 54 Part 7 1984 (BS 5445 Part 7 1984).

**Shock:**

To EN 54 Part 7 1984 (BS 5445 Part 7 1984).

**Static:**

IEC 801-2 (BS 6667 Part 2 1985).

Severity Level 3.

Tested to 12,000 V positive and negative to the case and supply terminals from a 250pF capacitor.

**Radiated Emissions:**

BS 6527 Class B.

**Radiated Susceptibility:**

IEC 801 Part 3 Class 3 (10 V/m).

Tested to 65 V/m from 27MHz to 1GHz.

**IP Rating:** 43.

**Dimensions:**

Detector: 100mm x 42mm (diameter x height).

Detector in Base:

100mm x 50mm (diameter x height).

**Weights:**

Detector: 99 grams.

Detector in Base: 150 grams.

**Materials:**

Detector housing: White polycarbonate V-O rated to UL 94.

Terminals: Stainless steel.



**Typical Quiescent and Alarm Currents**

Detector Status				
Supply Voltage (V)	Average Standby Current (µA)	Pulse Current Maximum (µA)	Smoke Alarm Current (mA)	Smoke Alarm (LED Fault) (mA)
28	38	110	61	54
24	37	90	52	46
17	35	60	37	33
10	N/A	N/A	18	16
6	N/A	N/A	8	7

**Table 2**





Series 60 Heat Detector

Part no. 55000-100 Grade 1  
55000-101 Grade 2  
55000-102 Grade 3  
55000-103 Range 1  
55000-104 Range 2

## SERIES 60 HEAT DETECTOR

### Operating Principles

The Series 60 heat detector contains a pair of matched negative temperature coefficient thermistors mounted on a printed circuit board within a white polycarbonate housing. One thermistor is exposed and is therefore in good thermal contact with the surrounding air and responds quickly to changes in air temperature. The other thermistor is insulated from the surrounding air and responds more slowly.

Under stable conditions, both thermistors are in thermal equilibrium with the surrounding air and will have the same resistance value. If the air temperature increases rapidly then a temperature difference develops between the thermistors and the resistance of the exposed thermistor becomes less than that of the insulated thermistor. The ratio of the resistances of the thermistors is monitored electronically and a fire alarm is initiated if the ratio exceeds a factory preset level. This feature of the operating principle determines the 'rate of rise' response of the detector.

If the air temperature increases slowly, no significant temperature difference develops between the thermistors. However, at high temperatures a fixed value resistor, connected in series with the insulated

thermistor becomes significant. When the sum of the resistances of the insulated thermistor and fixed resistor compared to the resistance of the exposed thermistor reaches a preset ratio, an alarm is initiated. The value of the fixed resistor is selected so that the detector goes into the alarm state at a specified 'fixed temperature' value.

### Electrical Description

The detector is designed to be connected to a two wire monitored supply of between 17 and 28 volts dc.

Connection to the supply is made in the mounting base between L1 and L2 and is polarity insensitive. Terminal L1 IN is a supply input terminal and it is connected to Terminal L1 OUT via the detector when fitted. L1 OUT and L2 provide the supply output to the next detector on the zone or to the end of line device. This method of connection permits continuous monitoring of the supply through the detector and the end of line device.

A remote alarm indicator may be connected between the positive supply line and the -R terminal. The -R terminal is diode gated to protect it against accidental connection to the negative supply and to permit the connection of more than one detector to a single remote indicator. The current taken through the -R terminal should be externally limited to 23mA. The Apollo remote indicator part no. 53832-070 typically sinks 8mA and is suitable for direct connection between the positive supply and the -R terminals. It is not polarity sensitive and provides constant brightness over the supply range 8 to 28 volts to the detector.

A one-second interruption of the supply to a detector will reset the detector's alarm circuit and restore it to the standby condition, provided that normal temperature conditions have been restored.

### Response Times

The European Standard EN 54 (BS 5445) categorises heat detector according to their response times and fixed upper limits.

Detectors are classified as being Grades 1, 2 or 3 (for most normal applications) or Ranges 1 or 2 (for high temperature environments).

The fixed upper temperatures for Grades 1, 2 and 3 are 60°C, 65°C and 75°C respectively and for Ranges 1 and 2 80°C and 100°C. All have a rate of rise element, but this differs according to the response time, Grade 1 being fastest responding.

EN 54 lays down upper and lower response limits for each detector grade or range and Apollo has set limits for the response of Series 60 detectors within these parameters.

Figures 8–12 show the EN 54 limits for each type of detector, in terms of the temperature at which the detector will change to alarm at different rates of increase in temperature, and the time taken to reach the alarm level.

The response of Series 60 heat detectors is shown within these limits.

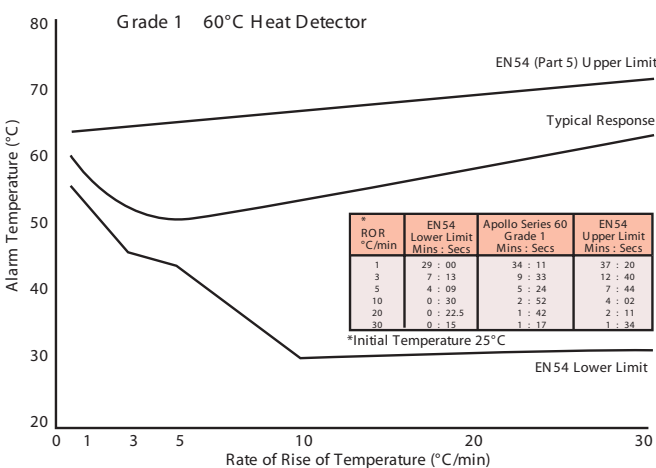


Fig. 8

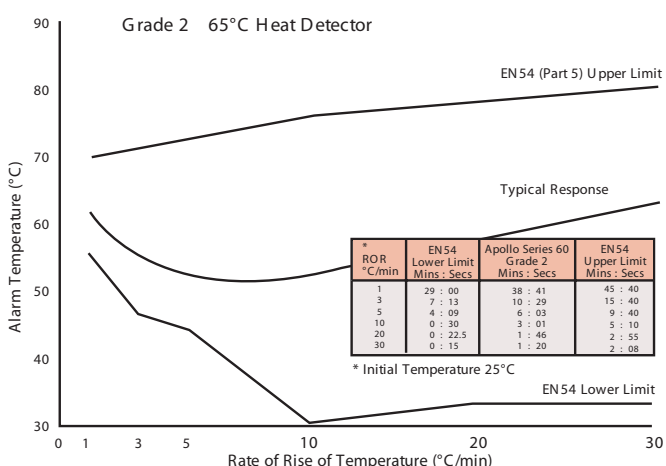


Fig. 9

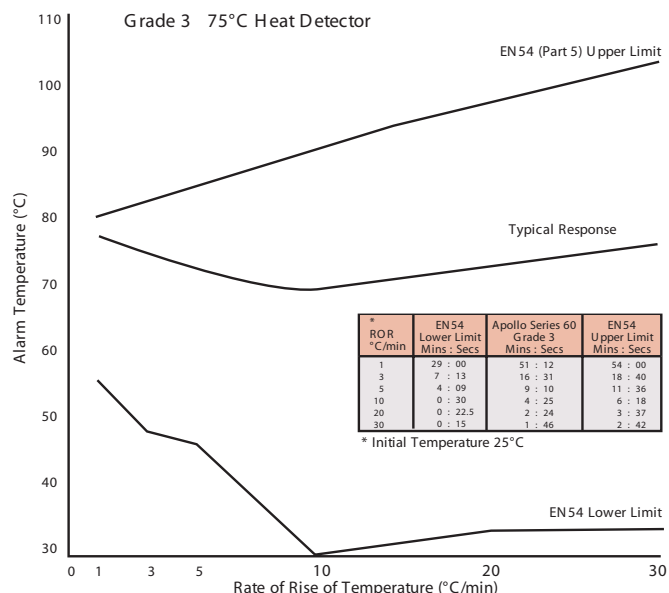


Fig. 10

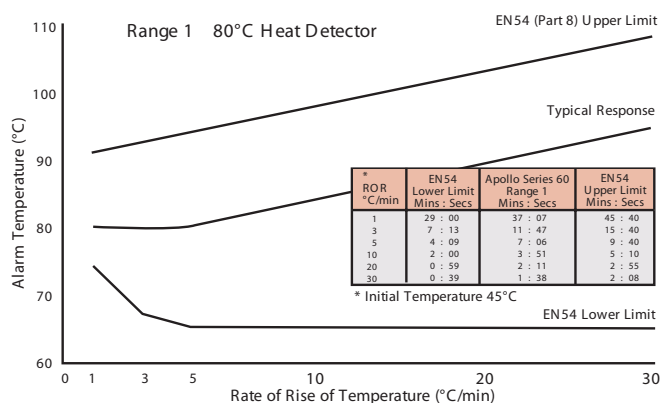


Fig. 11

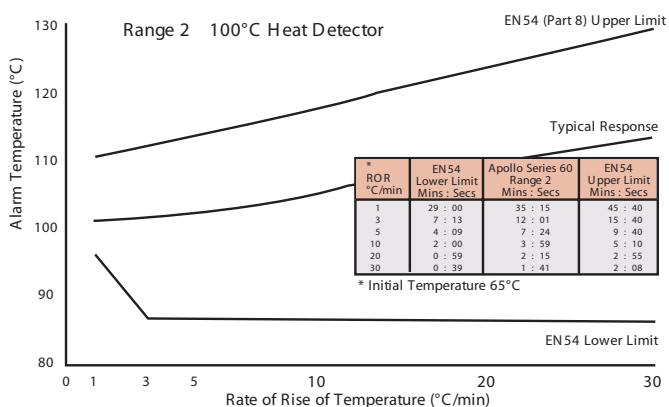


Fig. 12



## Technical Data - Heat

Specifications are typical and given at 23°C unless otherwise specified.

### **Detector Type:**

Rate of rise heat detectors

### **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:**

17 to 28V

### **Ripple Voltage:**

2V peak to peak maximum at 0.1Hz to 100kHz.

### **Quiescent Current:**

All types: 51µA +/- 2µA, at 24V.

### **Switch-on Surge Current:**

As per Quiescent Current

### **Alarm Voltage:**

6 to 28V.

### **Alarm Current:**

50–52mA at 24V.

### **Alarm Indicator:**

Red Light Emitting Diode (LED).

### **Design Alarm Load:**

450Ω in series with a 3V drop (LED open circuit).

### **Holding Voltage:**

6V.

### **Holding Current:**

10mA.

### **Minimum Voltage Required to Light Alarm Indicator:**

12V.

### **Remote Output Characteristics:**

900Ω in series with a 3 V drop at 24V with 500Ω line impedance gives:

1mA at 9V

4.5mA at 5V

8.0mA at 1V

### **Storage Temperature Range:**

–30°C to 120°C.

### **Operating Temperature:**

–20°C to +90°C (no icing)

### **Humidity:**

0% to 95% relative humidity.

### **Atmospheric Pressure:**

Unaffected.

### **Vibration:**

To EN 54 Part 5/8 (BS 5445 Part 5/8).

### **Impact:**

To EN 54 Part 5/8 (BS 5445 Part 5/8).

### **Shock:**

To EN 54 Part 5/8 (BS 5445 Part 5/8).

### **Static:**

12,000V positive or negative to case and supply terminals from 250pF capacitor at 50% relative humidity.

### **Radiated Emissions:**

To BS 6527 Class B.

### **Radiated Susceptibility:**

To IEC 801 (BS 6667) Part 3 Class 3.

Tested to 75 Volts/metre from 27 MHz to 1 GHz.

### **IP Rating:**

54

### **Dimensions:**

Detector: 100mm x 42mm (Diameter x Height).

Detector in Base:

100mm x 50mm (Diameter x Height).

### **Weights:**

Detector:

80 grams.

Detector in Base:

131 grams.

 CE marked



## Typical Quiescent and Alarm Currents

Detector Status						
Supply Voltage (V)	Quiescent Current $\mu$ A					Alarm Current mA
	G1	G2	G3	R1	R2	
28	55	56	56	56	57	62
24	50	51	51	51	52	52
17	42	43	43	43	44	36
10	26	26	26	27	27	19
6	12	13	13	13	13	10

Table 3

Heat detectors are readily distinguished from smoke detectors by having open webs to allow the free movement of air around the exposed thermistor. For ease of identification Series 60 heat detectors are colour or number coded (see Table 4).

## Heat Detector Identification Coding

Detector	Identification
Grade 1	Green label
Grade 2	Yellow label
Grade 3	Red label
Range 1	80
Range 2	100

Table 4



Series 60 Mounting Base

Part no. 45681-200

## SERIES 60 MOUNTING BASE

All detectors in the Series 60 range will fit into a new design of mounting base with a diameter of 100mm.

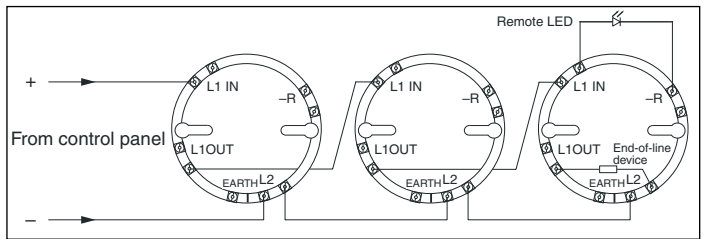
The base has five terminals: Line 1 in, Line 1 out, Line 2 in and out, Remote LED negative and ground. The detectors are polarity insensitive, so that identification of the positive and negative lines is required only when connecting a remote LED. A ground connection is not required either for safety or the correct operation of detectors. The grounded terminal is provided only for the tidy termination of grounded conductors and maintaining ground continuity between cables which contain a grounded conductor. All terminals are marked as to their function.

Series 60 bases have a wide interior diameter for ease of access to wires and terminals and two slots for fixing screws such that two screws may be fitted at any distance between 51mm and 69mm from each other.

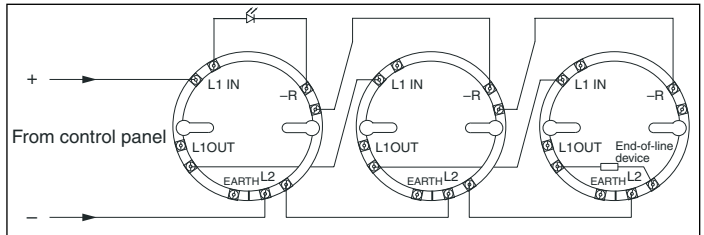
The design of the base is such that the detector will fit in one way only, without snagging, and that a simple clockwise motion without push force is required to plug in a detector.

When fitting a detector to a base in a confined space, 110mm of space, measured from the surface to which the base is fitted, should be allowed for fitting and removal.

For conventional systems that are designed to operate correctly when one or more detector heads have been removed, a base fitted with a diode on line 1 is available, **part no. 45681-201**.



**Fig. 13** Schematic Wiring Diagram of Series 60 Monitored Detector Circuit



**Fig. 14** Schematic Wiring Diagram of Series 60 Monitored Detector Circuit with a Common Remote Indicator.

**Note:** Polarity should be observed on detectors beyond the one driving the remote indicator.

Earth terminal is provided for easier installation and is not required by the detector head.

## SERIES 60 RELAY BASE

The Series 60 relay base **part no. 45681-360** is an extended version of the standard Series 60 base and incorporates a single-pole voltage-free changeover contact for switching ancillary equipment. The maximum contact switching voltage is 50V.

When the detector changes to the alarm state, the relay is energised, causing the contact to change state from normally open to closed or from normally closed to open. The contact will remain in this condition until the detector is re-set.

## OTHER BASE VARIANTS

A number of mounting accessories and base variants, including 150mm (6 inch) bases are available. Details are provided in Apollo publication PP1089, which is available on request.



## MECHANICAL CONSTRUCTION

All detectors in the Series 60 range have the same external dimensions, with the housing of the ionisation and optical detectors being identical. The material used to mould the housings is a UL 94 V-O grade of polycarbonate in a pure white finish.

The external alarm indication is by means of a light-emitting diode (LED) mounted on the printed circuit board within the housing and protruding through the housing to be easily visible.

The LED on the ionisation smoke detector is red, whereas the optical smoke detector is distinguished by having a clear LED which emits red light on changing to the alarm state.

All detectors in the Series 60 range have four stainless steel wipers at the top of the housing which make electrical contact with the double terminals when the detector is fitted to the standard Series 60 base.

Both ionisation and optical smoke detectors have an interior shield fitted for increased protection against radio frequency interference emitted by external electronic devices.

## INTERCHANGEABILITY

Any detector in the Series 60 range may be replaced with any other type in the range. If, for example, a smoke detector proved unsuitable for a particular application, it could simply be replaced with a heat detector.

The bases are designed specifically for Series 60 detectors and will not accept devices from other Apollo product ranges, including earlier Apollo models.

## CONTROL PANEL COMPATIBILITY

Series 60 has been designed to be connected to any conventional control panel that will operate existing ranges of Apollo conventional detectors.

Guidelines for proving compatibility between control panels and Apollo detectors may be obtained from Apollo.

When engineering systems with Series 60, it should be borne in mind that the alarm impedance of a detector be considered as 450 Ohms in series with a 3 volt drop with LED open circuit.

Typical current against voltage characteristics for quiescent and alarm states are shown in Tables 1, 2 and 3.

## APPROVALS

Series 60 detectors have been designed to comply with EN54 (BS 5445) as well as UL standards. They comply with EMC directive 89/336/EEC and are CE marked.

The detectors have been approved by a number of approvals bodies throughout the world including LPCB in the UK and VdS in Germany.

Series 60A detectors are UL Listed.





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Certificate number 010

