Optical Smoke Detector	▲ Part nos
Standard detector	55000-317
Detector with flashing LED	55000-316
Detector with reed switch & flashing LED	55000-315

OPERATING PRINCIPLES

The Series 65 Optical Smoke 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 case a printed circuit board has the optical system mounted on one side and the signal processing electronics on the other. The sensing chamber is a black moulding configured as a labyrinth which prevents penetration of ambient light. The labyrinth has a fine gauze insect-resistant cover. The chamber houses an infrared light emitting diode (LED) and a photo-diode which has an integral visible-light filter as extra protection against ambient light.

Every 3 seconds the LED emits a burst of collimated light, modulated at 4kHz. In clear air, light from the LED does not fall directly on the diode because the LED is positioned at an obtuse angle to the diode (as shown in Fig 2).

When smoke enters the chamber, a fraction of the collimated light is scattered onto the photo-diode. If the resulting signal from the photo-diode is above a preset threshold, the LED emits two more bursts of light, this time at two-second intervals. If light is scattered onto the photo-diode by both these pulses – due to the presence of smoke – the detector signals an alarm state by switching 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 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.

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.

OPTIONS

1. Flashing LED: The integral LED flashes when the detector is in a quiescent state.
2. Reed Switch and Flashing LED: A reed 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.

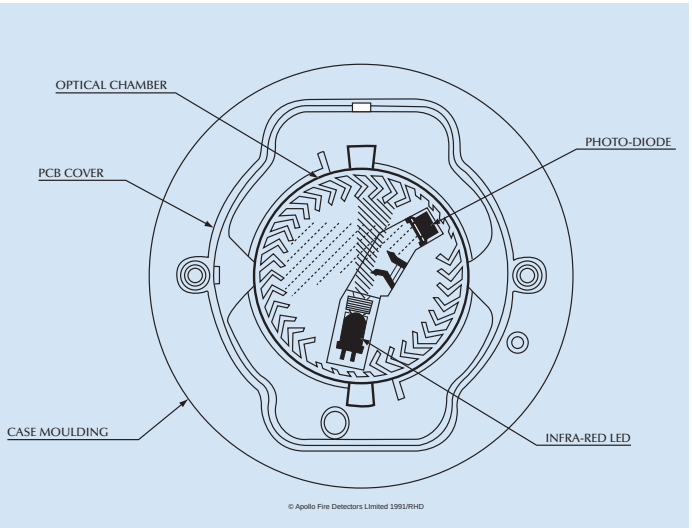

Fig.2 Top section, Series 65 Optical Smoke Detector

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:
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 3 seconds

Confirmation Frequency:
Once every 3 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:
9 to 33V DC

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

Quiescent Current:
30–50µA at 24V

Switch-on Surge Current:
115µA at 24V

Alarm Voltage:
6 to 28V

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

Alarm Indicator:
Clear light emitting diode (LED) emitting red light

Design Alarm Load:
420Ω in series with 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

Sensitivity:
Nominal alarm threshold of 0.15dB/m obscuration, measured in accordance with EN 54–7: 2000

Temperature Range:
–20° to +60°C
(no condensation or icing).

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

Wind Speed:
Insensitive to wind

Atmospheric Pressure:
Insensitive to atmospheric pressure

Wind Speed:
10m/s maximum

IP Rating:
23D in accordance with BS EN 60529

EMC, approvals and regulatory compliance:
Refer to Page 14 of this document

Dimensions: (dia. x height)
Detector: 100x42mm
Detector in Base: 100x50mm

Weights:
Detector: 99g
Detector in Base: 150g

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

CE
CE 3852

technical data

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SERIES 65 HEAT DETECTOR

Series 65 Heat Class A1R	▲ Part nos
Standard detector	55000-122
Detector with flashing LED	55000-121
Detector with reed switch & flashing LED	55000-120
Series 65 Heat Class BR	
Standard detector	55000-127
Detector with flashing LED	55000-126
Detector with reed switch & flashing LED	55000-125
Series 65 Heat Class CR	
Standard detector	55000-132
Detector with flashing LED	55000-131
Detector with reed switch & flashing LED	55000-130
Series 65 Heat Class CS	
Standard detector	55000-137
Detector with flashing LED	55000-136
Detector with reed switch & flashing LED	55000-135

OPERATING PRINCIPLES

The detector has a moulded self-extinguishing white polycarbonate case. Nickel plated stainless steel wiper contacts connect the detector to the base. Inside the case a printed circuit board holds the signal processing electronics.

A pair of matched negative temperature coefficient thermistors are mounted on the PCB in such a way that one thermistor is exposed to give good thermal contact with the surrounding air while the other thermistor is thermally insulated.

Under stable conditions both thermistors are in thermal equilibrium and have the same value of resistance. If air temperature increases rapidly the resistance of the exposed thermistor becomes less than that of the insulated thermistor. The ratio of the resistance of the thermistors is monitored electronically and an alarm is initiated if the ratio exceeds a factory preset level. This feature determines the 'rate of rise' response of the detector.

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

When the sum of the resistance of the insulated thermistor and the fixed resistor compared to the resistance of the exposed thermistor reaches a preset value, an alarm is initiated. The value of the fixed resistor is selected to set the detector into alarm state at a specified fixed temperature.

The detector signals an alarm state by switching an alarm latch on, increasing the current drawn from the supply from about 50µA to a maximum of about 75mA. This fall in the impedance of the detector is recognised by the control panel as an alarm signal.

The alarm 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.

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 restore a normal temperature level and interrupt the electrical supply to the detector for a minimum of one second.

OPTIONS

1. Flashing LED: The integral LED flashes when the detector is in a quiescent state.
2. Reed Switch and Flashing LED: A reed 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.

RESPONSE TIME

European Standard EN54–5:2000 classifies heat detectors according to the alarm temperature and ambient operating temperature.

Each heat detector classification has a static response (changing to alarm at a preset temperature) and may also have a rate of rise response (changing to alarm at or above a preset increase of temperature). The heat detector classes available in Series 65 are A1R, BR, CR, CS.

The suffix R indicates that the detector has been tested and approved as a 'rate-of-rise' detector. The suffix 'S' indicates that the detector has been tested and approved as a 'static' detector.

Supply Voltage (V)	A1R Standard		A1R Flashing LED		A1R Flashing LED/ Reed Switch	
	Quiescent	Alarm	Quiescent	Alarm	Quiescent	Alarm
24	45µA	52mA	55µA	52mA	55µA	52mA
9	40µA	17mA	50µA	17mA	50µA	17mA

Table 1 Typical current against voltage charateristics for quiescent and alarm states

Class	Max application temperature °C	Max static response temperature °C	Part number		
			Standard	Flashing LED	Flashing LED/ Reed Switch
A1R	50	65	**55000-122**	**55000-121**	**55000-120**
BR	65	85	**55000-127**	**55000-126**	**55000-125**
CR	80	100	**55000-132**	**55000-131**	**55000-130**
CS	80	100	**55000-137**	**55000-136**	**55000-135**

Table 2 Series 65 Heat Detector Temperatures and part numbers

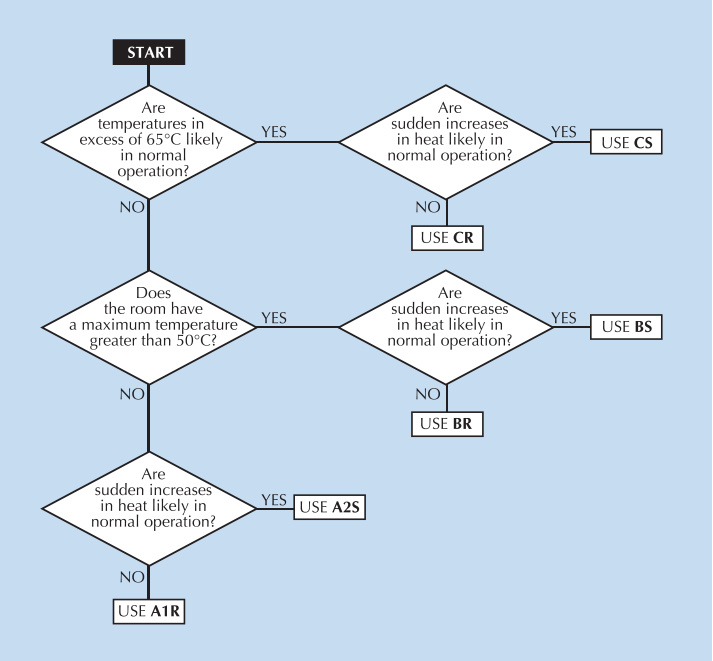

Fig. 3 Choosing a heat detector

TECHNICAL DATA

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

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

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

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

Quiescent Current:
See table 1

Switch-on Surge Current:
As per Quiescent Current

Alarm Voltage:
6 to 28V

Alarm Current:
See table 1

Alarm Indicator:
Red light emitting diode

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

Holding Voltage:
6V

Holding Current:
10mA

Minimum Voltage Required to Light Alarm Indicator:
12V

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

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

IP Rating:
23D in accordance with BS EN 60529

EMC, approvals and regulatory compliance:
Refer to Page 14 of this document

Dimensions: (dia. x height)

Detector:	100x42mm
Detector in Base:	100x50mm

Weights:

Detector:	80g
Detector in Base:	131g

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

CE

CE 3852

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