3 Heat Detector

3.1 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 co-efficient 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.

3.2 Product Codes

Product Description	SAI (AS7240-5)	LPCB (EN54-5)
Series 65 A1R (50°C) Heat Detector - Rate of Rise	4106-1004	55000-122AMP
Series 65 BR (65°C) Heat Detector - Rate of Rise	4106-1005	55000-127AMP
Series 65 CR (80°C) Heat Detector - Rate of Rise	4106-1006	55000-132AMP
Series 65 CS (80°C) Heat Detector - Static	4106-1007	55000-137AMP

3.3 Options:

1. Flashing LED: The integral 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

3.4 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.

Class	Max Application Temperature ℃	Max Static Response Temperature ℃	Standard Item No
A1R	50	65	55000-122AMP
BR	65	85	55000-127AMP
CR	80	100	55000-132AMP
CS	80	100	55000-137AMP

Table 1 - Series 65 Heat Detector temperature and part numbers

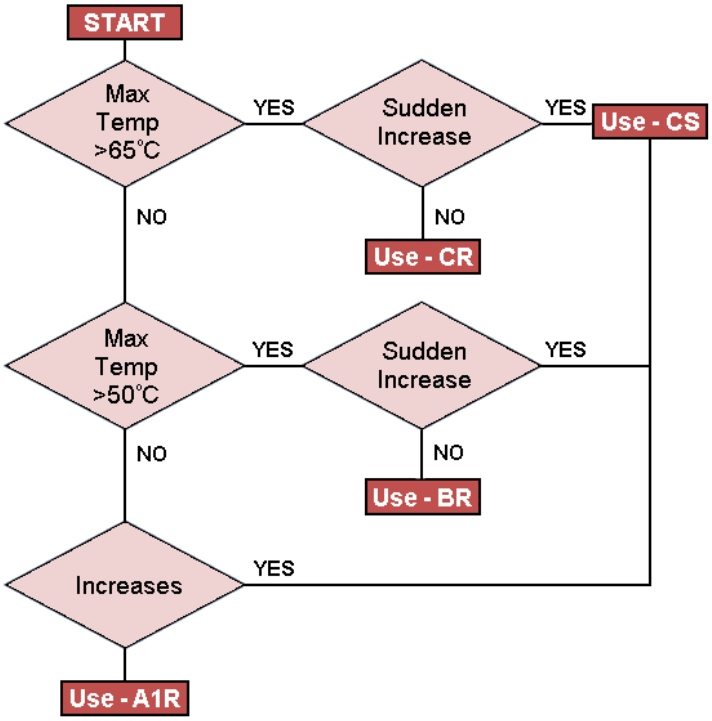

Figure 3 - Choosing a heat detector

Technical Data:

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

Detector Type:	Point type heat detector for fire detection and alarm systems for buildings
Detection Principle:	Photo-electric detection of light scattered in a forward direction by smoke particles
Supply Wiring:	Two wire monitored supply, polarity insensitive
Terminal Functions:	L1 IN and L2: supply in connections L1 OUT and L2: supply out connections -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:	Typical A1R = 45 µA @ 24V dc
Switch-on Surge Current:	As per Quiescent Current
Alarm Voltage:	6 to 28V
Alarm Current:	Typical A1R = 55 µA @ 24V dc
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)
Min Voltage to Illuminate Indicator:	12V
Remote Output Characteristic:	Remote is a current sink to the negative line limited to 17mA
Storage Temperature Range:	-30°C to 120°C Operating Temperature Range: -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
Dimensions:	Detector: 100mm Dia x 42mm H, Detector in Base: 100mm Dia x 50mm H
Weights:	Detector 80g, Detector in Base:131g
Material:	Detector housing: White polycarbonate rated V-0 in accordance with UL 94. Terminals: Nickel plated stainless steel