



**DISCOVERY  
OPTICAL/HEAT  
MULTISENSOR  
DETECTOR**

Part Number 58000-700

The Discovery Multisensor construction is similar to that of the optical detector but uses a different lid and optical mouldings to accommodate the thermistor (heat sensor). The sectional view (Fig. 3) shows the arrangement of the optical chamber and the thermistor.

The Discovery Optical/Heat Multisensor Detector contains an optical smoke sensor and a thermistor temperature sensor whose outputs are combined to give the final analogue value. The way in which the signals from the two sensors are combined depends on the response mode selected. The five modes provide response behaviour which incorporates pure heat detection, pure smoke detection and a combination of both. The multisensor is therefore useful over the widest range of applications.

The signals from the optical smoke sensing element and the temperature sensor are independent, and represent the smoke level and the air temperature respectively in the vicinity of the detector. The detector's micro-controller processes the two signals according to the mode selected (see Table 2). When the detector is operating as a multisensor (i.e. modes 1, 3 and 4) the temperature signal processing extracts only rate-of-rise information for combination with the optical signal. In these modes the detector will not respond to a slow temperature increase – even if the temperature reaches a high level. A large sudden change in temperature can, however, cause an alarm without the presence of smoke, if sustained for 20 seconds.

**Additional heat sensor information**

Discovery Optical/Heat Multisensor Detectors allow access to unprocessed temperature information (see note 1). The raw temperature data can be used in conjunction with the analogue value to enhance alarm signal processing and provide an additional level of safety.

The exact method of polling to make use of this feature is described in a technical document available to panel partners.

Discovery Multisensor Detector sectional view

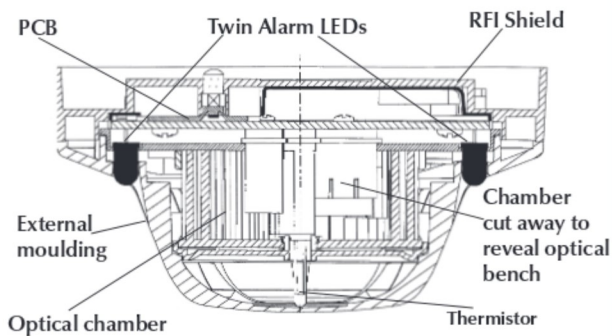


Fig. 3

Discovery Multisensor Detector operating modes

Mode	Sensitivity to Grey Smoke (%/m) (dB/m)	Temperature Sensitivity	Response Type	Minimum Time to Alarm (seconds)
1	1.1 0.05	>15°C increase	Multisensor	20
2	2.1 0.09	Not set to heat response	Optical	30
3	2.8 0.12	>21°C increase	Multisensor	20
4	4.2 0.19	>15°C increase	Multisensor	20
5	No response to smoke	See mode 5 opposite	Heat A1R	15

Table 2

The processing algorithms in modes 1 to 4 incorporate drift compensation.

With reference to Table 2 the characteristics of the five response modes are summarised below.

**Mode 1** has very high smoke sensitivity combined with high heat sensitivity. This gives a high overall sensitivity to both smouldering and flaming fires.

**Mode 2** has a smoke sensitivity similar to that of a normal optical smoke detector. This mode is therefore equivalent to a standard optical detector. It is suitable for applications in which wide temperature changes occur under normal conditions.

**Mode 3** has moderate smoke sensitivity combined with a moderate sensitivity to heat. This combination is considered the optimum for most general applications since it offers good response to both smouldering and flaming fires.

**Mode 4** has lower than normal smoke sensitivity combined with high heat sensitivity. This makes it suitable for applications in which a certain amount of fumes or smoke is considered normal.

**Mode 5** has no smoke sensitivity at all, but gives a pure heat detector response meeting the response time requirements for a Class A1R detector in the European standard EN 54-5. In this mode the detector will respond to slowly changing temperatures and has a "fixed temperature" alarm threshold at 58°C. The analogue value in this mode will give the approximate air temperature over the range 15°C to 55°C.

In mode 5, the smoke sensor is still active though it does not contribute to the analogue signal. As a consequence, if the detector is used in a dirty or smoky environment the optical sensor drift flag may be activated in the heat-only mode.

**Notes**

1. This applies only to fire control panels which have been programmed to read the additional information.
2. In situ testing of the Multisensor detector should be carried out as for smoke detectors in response mode 2 and for heat detectors in response mode 5. Both optical and heat sensors must be tested in modes 1,3 and 4.
3. If the Multisensor is to be used in mode 5, heat detector spacing/coverage should be applied.

## TECHNICAL DATA

### Discovery Multisensor Detector Part No. 58000-700

Specifications are typical at 24V, 23°C and 50% relative humidity unless otherwise stated.

<b>Detector principle:</b>	Smoke: Photo-electric detection of light scattered by smoke particles Heat: Temperature-dependent resistance
<b>Supply wiring:</b>	Two-wire supply, polarity insensitive
<b>Terminal functions:</b>	L1 & L2 supply in and out connections +R remote indicator positive connection (internal 2.2kΩ resistance to positive) -R remote indicator negative connection (internal 2.2kΩ resistance to negative)
<b>Operating voltage:</b>	17–28V DC
<b>Communication protocol:</b>	Discovery, XP95 & CoreProtocol compatible 5-9V peak to peak
<b>Quiescent current:</b>	470µA
<b>Power-up surge current:</b>	1mA
<b>Maximum power-up time:</b>	10s
<b>Alarm current, LED illuminated:</b>	3.5mA
<b>Remote output characteristics:</b>	Connects to positive line through 4.5kΩ (5mA maximum)
<b>Clean-air analogue value:</b>	23 +4/-0
<b>Alarm level analogue value:</b>	55
<b>Alarm indicator:</b>	2 colourless Light Emitting Diodes (LEDs); illuminated red in alarm. Optional remote LED
<b>Temperature range:</b>	-40°C to 70°C
<b>Humidity:</b>	0% to 95% RH (no condensation or icing)
<b>Effect of temperature on Optical Sensor:</b>	None
<b>Effect of wind on optical sensor:</b>	None
<b>Vibration, impact &amp; shock:</b>	EN 54-5 & EN 54-7
<b>Designed to IP Rating:</b>	IP44 in accordance with BS EN 60529
<b>Standards &amp; approvals:</b>	EN 54-5, EN 54-7, CPD, LPCB, VdS, BOSEC, FG, SBSC, SIL & VNIPO For more information see page 31 or <a href="http://www.apollo-fire.co.uk">www.apollo-fire.co.uk</a>
<b>Dimensions:</b>	100mm diameter x 50mm height (58mm height with XPERT 7 Mounting Base)
<b>Weight:</b>	Detector 105g Detector with XPERT 7 Mounting Base 160g
<b>Materials:</b>	Housing White polycarbonate UL94-V0 Terminals Nickel plated stainless steel
<b>Smoke element only:</b>	
<b>Chamber configuration:</b>	Horizontal optical bench housing infra-red emitter and sensor, arranged radially to detect forward scattered light
<b>Sensor:</b>	Silicon PIN photo-diode
<b>Emitter:</b>	GaAIAs infra-red light emitting diode
<b>Sampling frequency:</b>	1 per second