DISCOVERY MULTISENSOR DETECTOR

Part N. 5000-400

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 (Fig2.) 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. 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 combi nation 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, how-ever, 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. 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.

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 or 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.

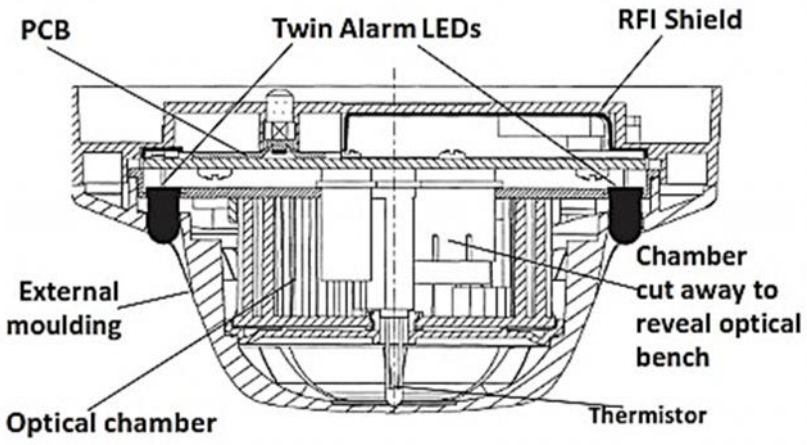

Figure 2 Discovery Multisensor Detector sectional view

Mode	Sensitivity to		Temperature Sensitivity	Response Type	Minimum Time to Alarm (seconds)
	Grey (%/m)	Smoke (dB/m)			
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 1: Discovery Multisensor Detector operating modes

TECHNICAL DATA

Discovery Multisensor Detector

Part No. 5000-400

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

Detector principle:	Smoke:	Photo-electric detection of light scattered by smoke particles
	Heat:	Temperature-dependent resistance
Supply wiring:	Two-wire supply, polarity insensitive	
Terminal functions:	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)
Operating voltage:	17–28V DC	
Communication protocol:	Discovery, XP95 & Core Protocol compatible 5-9V peak to peak	
Quiescent current:	470µA	
Power-up surge current:	1mA	
Maximum power-up time:	10s	
Alarm current, LED illuminated:	3.5mA	
Remote output characteristics:	Connects to positive line through 4.5kΩ (5mA maximum)	
Clean-air analogue value:	23 +4/–0	
Alarm level analogue value:	55	
Alarm indicator:	2 colourless Light Emitting Diodes (LEDs); illuminated red in alarm. Optional remote LED	
Temperature range:	–40°C to 70°C	
Humidity:	0% to 95% RH (no condensation or icing)	
Vibration, impact & shock:	EN 54-5 & EN 54-7	
Designed to IP Rating:	IP44 in accordance with BS EN 60529	
Standards & approvals:	EN 54-7:2000 +A1:2002 +A2:2006, EN 54-5:2000 +A1:2002 & CEA 4021:2003	
Dimensions:	100mm diameter x 50mm height (58mm height with XPERT 7 Mounting Base)	
Weight:	Detector Detector with XPERT 7 Mounting Base	105g 160g
Materials:	Housing Terminals	White polycarbonate UL94-V0 Nickel plated stainless steel
Smoke element only:		
Chamber configuration:	Horizontal optical bench housing infra-red emitter and sensor, arranged radially to detect forward scattered light	
Sensor:	Silicon PIN photo-diode	
Emitter:	GaAlAs infra-red light emitting diode	
Sampling frequency:	1 per second	