Discovery

Optical/Heat Multisensor Detector

Product overview

Product	**Optical/Heat Multisensor Detector**
Part No.	**58000-700**
Digital Communication	**Discovery (XP95 and CoreProtocol® compatible)**

Product information

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.

- Ideal for a wide range of applications
- Enhanced false alarm management
- Unaffected by wind or atmospheric pressure
- Well suited to sensitive environments
- Five EN54 approved response modes
- Heat only and optical only options
- Remote test feature

Note: *For system compatibility and feature support of this device, please refer to your chosen panel manufacturer.*

Technical data

All data is supplied subject to change without notice. Specifications are typical at 24V, 25°C and 50% RH unless otherwise stated.

Detection 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 & out connections*
	+R	*Remote indicator positive connection (internal 2.2kΩ resistance to positive)*
	–R	*Remote indicator negative connection (internal 2.2 kΩ resistance to negative)*
Operating voltage	*17 - 28 V dc*	
Communication protocol	*Discovery (XP95 and CoreProtocol compatible)*	
Modulation voltage	*5 –9 V peak to peak*	
Quiescent current	*400 µA*	
Power-up surge current	*1 mA*	
Maximum power-up time	*10 seconds*	
Alarm current, LED illuminated	*3.5 mA*	
Remote output characteristics	*Connects to a positive line through 4.5 kΩ (5 mA maximum)*	
Clean air analogue value	*23 +4/-0*	
Alarm level analogue value	*55*	
Alarm indicator	*Two white diffused LEDs, illuminated red in alarm. Optional remote LED*	
Operating temperature	*-40°C to +70°C*	
Storage temperature	*-40°C to +80°C*	
Humidity	*0% to 95% RH (no condensation or icing)*	
Effect of temperature on optical sensor	*Less than 15% change in sensitivity over rated change. Slow changes in ambient conditions will automatically be compensted and will not affect sensitivity*	
Effect of wind speed on optical sensor	*None*	
Vibration, impact and shock	*EN 54-7*	
IP Rating	*IP44*	
Dimensions	*100 mm, diameter x 50 mm height*	
Weight	*105 g*	
Materials	*Housing: White flame-retardant polycarbonate* *Terminals: 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	*Once per second*	

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Operation

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 detector 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 detectors 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 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

The Discovery Optical/Heat Multisensor detector incorporates additional temperature information intended for use in signal processing.

Temperature data can be read separately by the control panel* and used to validate an alarm signalled by the multisensor analogue value. An example of this would be a high multisensor analogue value not accompanied by an increase in heat: this would indicate that an agent other than smoke, e.g. steam, had caused the high analogue value.

Electrical description

The Discovery Optical/Heat Multisensor detector is designed to be connected to a two wire loop circuit carrying both data and a 17 V to 28 V dc supply. The detector is connected to the incoming and outgoing supply via terminals L1 and L2 in the mounting base. A remote LED indicator requiring not more than 4 mA at 5 V may be connected between the +R and -R terminals. An earth connection terminal is also provided.

Features

Response modes

Discovery Optical/Heat Muitisensor detectors can be operated in any one of five EN54 approved response modes, which can be selected through the fire control panel. Each mode corresponds to a unique response behaviour, which is related to sensitivity to fire. Mode 1 gives a higher sensitivity to fire than Mode 5.

Discovery Optical/Heat Multisensor detector operating modes

Mode	Smoke sensitivity (grey smoke)		Temp sensitivity (relative)	Response type	Minimum time to alarm (seconds)
	%/m	dB/m			
1	1.1	0.06	High	Multisensor	20
2	2.1	0.12	Not set to heat response	Optical	30
3	2.8	0.16	Low	Multisensor	20
4	4.2	0.24	2.1	Multisensor	20
5†	No response to smoke		See Mode 5†	Heat A1R	15

Characteristics of the response modes

The processing algorithms in modes 1 to 4 incorporate drift compensation. The characteristics of the five response modes listed above are summarised as follows:

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 flaming and smouldering 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 dœs 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 the control panels that have been programmed to read the additional information.*
2. *In-situ testing of a multisensor detector should be done as for smoke detectors in response Mode 2 and for heat detectors in response Mode 5. Both optical and heat modes should be tested in Modes 1, 3 and 4.*
3. *If the multisensor detector is to be used in Mode 5, heat detector spacing/coverage should be applied.*

Flashing LEDs

Discovery Optical/Heat Multisensor detectors have two integral LED indicators, which can be illuminated at any time by the fire control panel to indicate detectors in alarm. A flashing LED mode can also be programmed to activate each time a detector is polled.

Remote test feature

The remote test feature is enabled from the fire control panel. On receipt of the command signal from the fire control panel, the detector is forced electrically into alarm. An analogue value of 85 is returned to the fire control panel to indicate that the detector is working correctly.

Rejection of transient signals

Discovery detectors are designed to give low sensitivity to very rapid changes in the sensor output, since these are unlikely to be caused by real fire conditions, resulting in fewer false alarms.

Drift compensation

Discovery Optical/Heat Multisensor detectors include compensation for signal drift to compensate for changes in the sensor output caused, for example by dust in the chamber, and will therefore hold the sensitivity at a constant level even with severe chamber contamination. This increased stability is achieved without significantly affecting the detectors sensitivity to fire whilst still meeting the requirements of the EN54 standard.

EMC Directive 2014/30/EU

The Discovery Optical/Heat Multisensor detector complies with the essential requirements of the EMC Directive 2014/30/EU, provided that it is used as described in this data sheet.

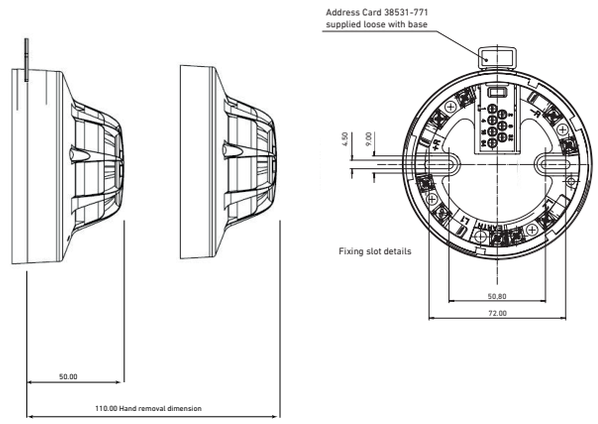
A copy of the Declaration of Conformity is available from Apollo on request.

Construction Products Regulation 305/2011/EU

The Discovery Optical/Heat Multisensor detector complies with the essential requirements of the Construction Products Regulation 305/2011/EU.

A copy of the Declaration of Performance is available from Apollo on request.

Discovery Optical/Heat Multisensor detector dimensions



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