

# Discovery UL

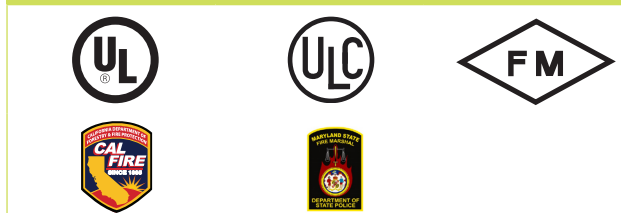
## Photoelectric/Heat Multisensor Detector



### Product overview

Product	Photoelectric/Heat Multisensor Detector
Part No.	58000-750
Digital Communication	XP95, Discovery and CoreProtocol® compatible

### Compliance



### Product information

The Discovery UL Photoelectric/Heat Multisensor Detector contains a photoelectric 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 UL approved response modes
- Heat only and photoelectric only options
- Remote test feature

### Technical data

All data is supplied subject to change without notice. Specifications are typical at 24V, 73°F and 50% RH unless otherwise stated.

<b>Detection principle</b>	<i>Smoke: Photoelectric detection of light scattered by smoke particles</i> <i>Heat: Temperature-dependent resistance</i>
<b>Sensitivity</b>	3.0 + 1.0 - 1.84 %/ft
<b>Communication protocol</b>	XP95, Discovery and CoreProtocol compatible
<b>Operating voltage</b>	17 - 28 V dc
<b>Modulation voltage</b>	5 - 9 V dc peak to peak
<b>Supervisory current</b>	500 µA
<b>Surge current</b>	1 mA
<b>Alarm current, LED illuminated</b>	3.5 mA
<b>Heat element rating</b>	135 °F - Mode 5
<b>Operating temperature range</b>	32 °F to 100 °F
<b>Humidity</b>	0% to 95% RH (no condensation or icing)
<b>Air velocity</b>	0 - 300 fpm
<b>Standards &amp; approvals</b>	UL, ULC, FM, CSFM and MSFM
<b>Dimensions</b>	3.93 in., diameter x 16.5 in. height
<b>Weight</b>	3.70 oz
<b>Materials</b>	<i>Housing: White flame-retardant polycarbonate</i> <i>Terminals: Nickel plated stainless steel</i>
<b>Test method</b>	<i>Home safeguard</i> <i>Sensitivity test</i> <i>No climb</i> <i>Gemini 501</i> <i>Hair dryer (heat sensor only)</i>
<b>Spacing</b>	<i>Install as per NFPA72 and local requirements. On smooth, flat ceilings, spacing of 30 feet may be used as a guide</i>

## 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 photoelectric 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 UL Photoelectric/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 UL Photoelectric/Heat Multisensor Detector is designed to be connected to a two wire loop circuit carrying both data and a 17V to 28V 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 UL Optical/Heat Multisensor Detectors can be operated in any one of five UL 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 UL Photoelectric/Heat Multisensor Detector operating modes			
Mode	Alarm @ 55 counts (%/ft)	Heat classification @55 counts	30 s alarm delay
1	1.3	140°F rate of rise	Yes
2	1.9	N/A	Yes
3	2.6	140°F rate of rise	Yes
4	3.3	140°F rate of rise	Yes
5	N/A	135°F fixed temperature (and rate of rise)	N/A

### 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<sup>†</sup>** has no smoke sensitivity at all but gives a pure heat detector response meeting the response time requirements for a 135 °F fixed temperature and rate-of-rise detector in the UL Standard 521. In this mode the detector will respond to slowly changing temperatures and has a 'fixed temperature' and 'rate of rise' alarm threshold at 135°F. The analogue value in this mode will give the approximate air temperature over the range 59°F to 131°F.

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 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 UL Photoelectric/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**

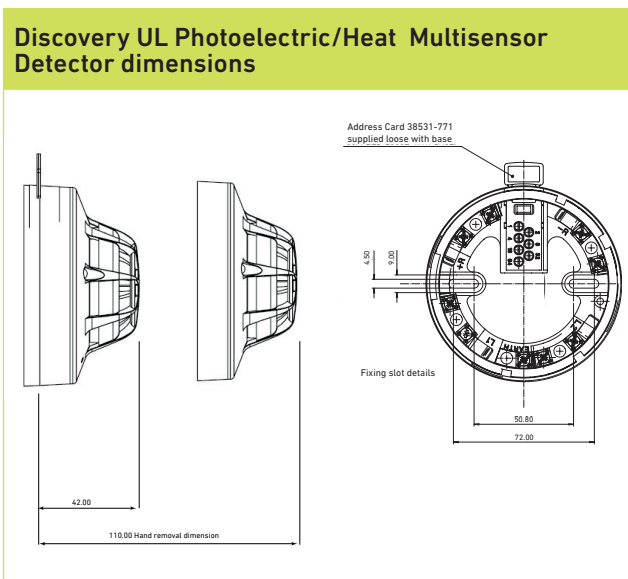
The remote test feature is enabled from the fire control panel. On receipt of the command signal from the fire control panel, the detector is forced electrically into alarm. An analogue value of 85 is returned to the fire control panel to indicate that the detector is working correctly.

**Rejection of transient signals**

Discovery UL 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 UL Photoelectric/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 UL standard.



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