



# Discovery CO/Heat Multisensor Detector

## FUNCTION

The Discovery® Carbon Monoxide/Heat Multisensor Detector, part no 58000-305, provides early warning of fire by detecting the presence of carbon monoxide or heat or a combination of both.

It is designed to be connected to control panels using the Apollo Discovery protocol.

## FEATURES

- Early warning of carbon-based smouldering fires
- Good detection of flaming fires
- Ideal for protecting small volume sleeping risk areas
- Resistance to false alarms caused by steam, dirt and dust

## APPLICATION

Carbon monoxide (CO) detectors are suitable when there is a risk of a deep-seated, smouldering fire. These typically produce large amounts of CO. They should be used in an enclosed space with a floor size of not more than 50m<sup>2</sup> and where there is a likelihood of stratification.

The use of a heat-sensitive element, the thermistor, to create a CO/heat multisensor widens the scope of the detector to cover fire risks which might not produce sufficient quantities of carbon monoxide but would create heat.



Part no 58000-305

If the protected area is an escape route or corridor CO/heat multisensor detectors should be used for supplementary detection and not as the main means of detecting fires.

They should not be used if the protected area is exposed to sources of CO, eg, vehicle exhausts, to hydrogen vapour or alcohol vapour as emitted by some cleaning agents.

## SITING AND SPACING

CO/heat multisensors should be sited and spaced according to the recommendations of BS5839: Part 1 or other applicable local code of practice for designing a fire detection system.



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Carbon monoxide is a gas which spreads by diffusion and it may reach a detector faster than smoke would. But it is just as possible that the opposite would occur and this should be borne in mind when designing a fire detection system.

If it is thought that the CO/heat multisensor might be operated at times purely as a heat detector the siting and spacing should be as for a normal heat detector.

### FALSE ALARMS

Carbon monoxide detectors are less susceptible than smoke detectors to false alarms from sources such as toast, steam, cooking, plumbing work and hair spray. Heat detectors are also less susceptible to false alarms with the exception of exposure to heat, in particular sudden increases in heat.

Vehicle exhausts, open fires, gas fires are among the sources of CO which may trigger a false alarm in a CO/heat multisensor.

Caution: CO/heat multisensor detectors should not be used in place of carbon monoxide alarms used for warning purposes and conforming to BS7860 or UL2034.

### OPERATING MODES

The Discovery CO/Heat Multisensor has five operating modes which are a combination of response and time to alarm. Table 2 on the next page gives details of the operating modes.

### PROTOCOL USAGE

The Discovery CO/Heat Multisensor operates only with the Discovery protocol; for details please see Table 1 below.

Output Bits	
2	Alarm LEDs illuminated
1	CO sensor remote test
0	Remote indicator illuminated
Interrupt	No
Analogue Value	
1	CO sensor fault
2	Heat sensor fault
8 or lower	Fault
25±2	Clear air value
55 or higher	Alarm or remote test successful
Input Bits	
2	LED status, 1=On
1	Test status, 1=On
0	Remote LED status, 1=On
Flag Setting	
XP95 Flag	Yes
Alarm Flag	Yes

**Table 1 Protocol Usage**

### PRECAUTIONS WHEN INVESTIGATING ALARMS

It is important to remember that CO is a colourless, odourless gas, which is not directly detectable by human senses. If a CO/heat multisensor fire detector is in an alarm condition, it is possible that a dangerous level of CO exists around the detector. Extreme care must be taken when investigating alarms even if no combustion products can be seen or smelled.

Because of this danger, it is imperative that CO/heat multisensors are correctly identified at the control panel so that personnel investigating alarms may take the relevant precautions.

### MAINTENANCE AND SERVICE

The electrochemical cell used in the Discovery CO/Heat Multisensor has a more limited life than would normally be expected from a smoke detector. In a typical environment, the life of the cell is seven years.

High temperature or low relative humidity can, however, reduce the life significantly. The limits given in the section 'TECHNICAL DATA' overleaf should be carefully observed.

It is essential that systems using CO fire detectors be correctly maintained and that the maintenance schedule include functional testing of the CO fire detectors.

CO fire detectors will not respond to the aerosol testers commonly used for the in-situ testing of smoke detectors. Apollo recommends that CO fire detectors be tested using an Apollo dispenser head, part no 29600-100, with CO test gas, part no 29600-235. The Testifire detector tester can also be used for this purpose. If there is any doubt over the sensitivity of a Discovery CO fire detector it should be returned to Apollo for servicing and calibration.

### HEALTH AND SAFETY GUIDELINES

This product contains a sealed electro-chemical cell and in normal usage represents no chemical hazard in the sense of COSHH and the Health and Safety at Work Act 1974. Chemical hazard can, however, arise if the following notes on storage, handling and disposal are not observed.

For maximum life, the product should be stored before installation in clean dry conditions between 0°C and 20°C. It should not be exposed to temperatures outside the range -40°C to +60°C or to organic vapours.

The electrochemical cell contained in this product is fitted into sockets on the printed circuit board; to avoid damage to the cell do not remove it.

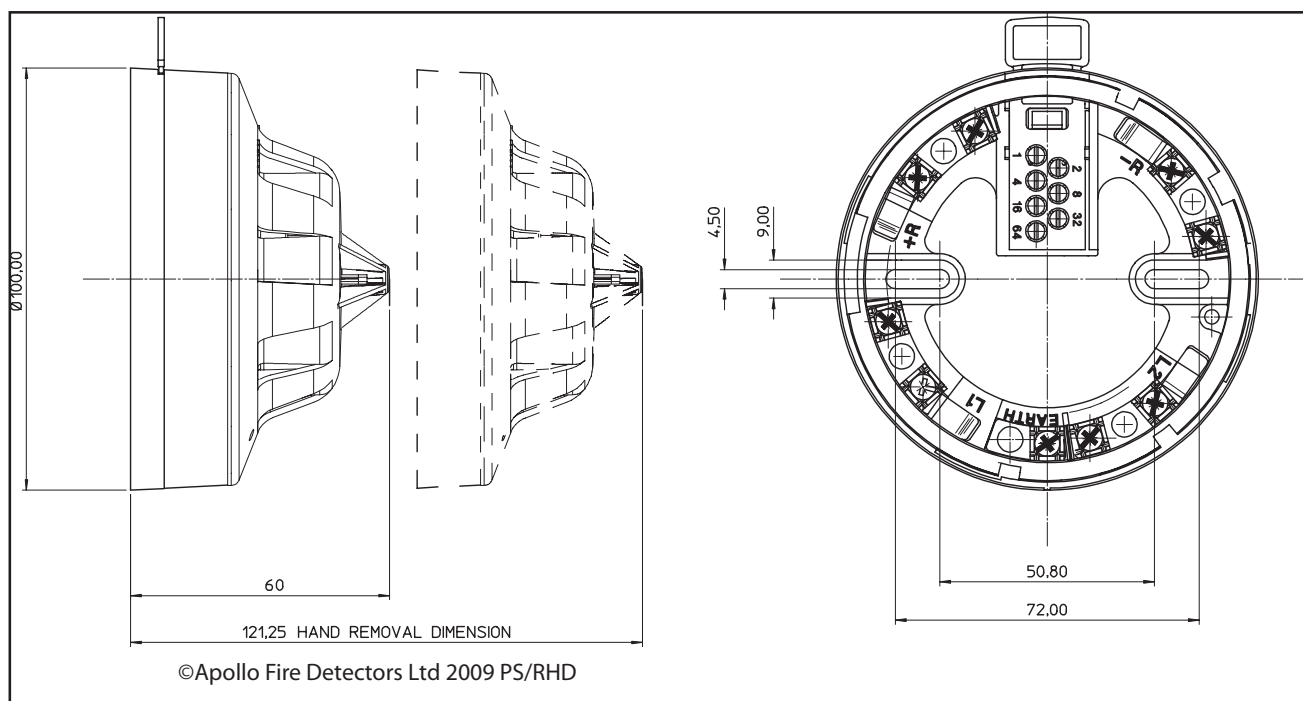
The electrochemical cell contains sulphuric acid in a relatively concentrated state. In the event of leakage (which may be caused by mechanical damage or use outside the operating specification for the cell) the cell should be removed from the detector using protective gloves. Avoid contact with any liquid. If skin or eye contact with the electrolyte occurs, wash

immediately with plenty of water and obtain medical advice. All traces of electrolyte should be washed away with copious amounts of clean water. The cell should be disposed of according to local waste management requirements and environmental legislation. It should not be burnt since it may release toxic fumes.

Mode	CO Sensitivity (ppm)	Temperature Sensitivity	Response Type	Minimum time to alarm (seconds)
1	30	>21°C increase	Multisensor	20
2	33	No response to heat	Carbon Monoxide	30
3	40	>21°C increase	Multisensor	20
4	45	>21°C increase	Multisensor	20
5	No response to CO	A1R*	Heat Rate of Rise; Static limit of 58°C	15

**Table 2 Operating Modes**

\*Response is A1R to EN54–5 with a fixed upper threshold of 58°C



**Fig 1 Detector fitting dimensions**

## TECHNICAL DATA

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

**Detector Part No:**  
58000-305

**Base Part No:**  
45681-210

**Detector principle:**  
CO: ambient carbon monoxide level  
Heat: Temperature sensitive resistance

**Sampling frequency:**  
1 per second

**Supply wiring:**  
Two-wire supply, polarity sensitive

**Terminal functions:**  
L2 positive in and out connections  
L1 negative in and out connections

+R: remote indicator positive connection  
(internal 2.2k $\Omega$  resistance to positive)

-R: remote indicator negative connection  
(internal 2.2k $\Omega$  resistance to negative)

**Operating voltage:**  
17-28V DC

**Quiescent current:**  
470 $\mu$ A average, 1mA peak

**Power-up surge current:**  
1mA

**Maximum power-up time:**  
10s

**Alarm current, LED illuminated:**  
3.5mA

**Remote output characteristics:**  
Connects to positive line through 4.5k $\Omega$  (5mA max)

**Clean air analogue value:**  
25  $\pm$ 2

**Alarm level analogue value:**  
55

**Alarm indicator:**  
2 red Light Emitting Diodes (LEDs); illuminated red in alarm; optional remote LED

**Storage Temperature:**  
+10 to +30°C

**Operating Temperature:**  
0°C to +50°C (Continuous)

-20°C to +55°C (Transient, >35% relative humidity)

**Humidity:**  
15 to 95% relative humidity (no condensation)

**Effect of temperature on CO cell:**  
Less than 15% change in sensitivity over rated range

**Effect of wind on CO cell:**  
None

**Maximum CO Cell Life:**  
7 years

**Operating pressure:**  
Atmospheric pressure  $\pm$ 10%

**Transport pressure:**  
If air freighted this detector should be carried in a pressurised hold

**Vibration, Impact and Shock:**  
To EN54

**IP rating:**  
43

**Dimensions:**  
100mm diameter x 54mm height  
60mm (height in base)

**Weight:**  
Detector 105g; Detector in base 160g

**Materials:**  
Housing: White polycarbonate, V-0 rated to UL94  
Terminals: Nickel plated stainless steel