



# Intelligent Base Mounted Flame Detectors

## FUNCTION

The Intelligent Base Mounted Flame Detectors are designed to protect areas where open fires may be expected.

## DETECTOR TYPES

Three types of flame detector are available:

- |                               |           |
|-------------------------------|-----------|
| 1. UV Flame Detector          | 55000-022 |
| 2. UV/ Dual IR Flame Detector | 55000-023 |
| 3. Triple IR Flame Detector   | 55000-024 |

## FEATURES

### UV

The detector is sensitive to ultraviolet radiation emitted by flames during combustion. Since it requires only UV radiation the detector responds even to stationary flames with no flicker like cigarette lighters and blue gas flames.

The detector is set to respond to ultraviolet radiation (185–260nm) emitted by almost all flames, including those invisible to the naked eye, e.g. hydrogen fires.

The detector has a single UV sensor with a narrow spectral response in order to discriminate between flames and most spurious sources of radiation and is designed for internal fully enclosed areas.

Caution: The detector will also detect electrical discharges from lightning or arc welding.



*Illustration shows UV Flame Detector*

### UV/DUAL IR

The detector is sensitive to ultraviolet and low-frequency, flickering infra-red radiation emitted by flames during combustion. Since it requires both UV and IR radiation the detector can operate in applications where a basic single UV or single IR detector would be inappropriate. The detector is set to respond to ultraviolet (185–260nm) and low-frequency flickering infra-red (0.75–2.7 $\mu$ m) radiation at 1–15Hz in order to detect all flickering flames, including those invisible to the naked eye, e.g. those emitted by hydrogen fires. The detector has one UV and two IR sensors responding to different wavelengths in order to discriminate between flames

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and spurious sources of radiation. False alarms due to electrical discharges from lightning or arc welding and flickering sunlight are minimised by combining the UV/IR signals.

**TRIPLE IR**

The detector is sensitive to low-frequency, flickering infra-red radiation emitted by flames during combustion. Since it responds to flickering radiation the detector can operate even if the lens is contaminated by a layer of oil, dust, water-vapour or ice. The detector is set to respond to low-frequency radiation at 1–15Hz (0.75–2.7µm) in order to detect all flickering flames, including those invisible to the naked eye, e.g. those emitted by hydrogen fires. The detector has three IR sensors that respond to different IR wavelengths in order to discriminate between flames and spurious sources of radiation. False alarms due to factors such as flickering sunlight are avoided by a combination of filters and signal processing techniques.

**APPLICATIONS FOR FLAME DETECTORS \***

**UV**

UV flame detectors are used when detection is required to be unaffected by convection currents, draughts or wind. These include engine rooms in ships, factories affected by draughts or wind and warehouses.

They are fast reacting and respond to a flame more than 25m away. The UV flame detector is affected by arc welding, electrical sparks, lightning, nuclear radiation and UV light sources. For applications where these phenomena are present a UV flame detector should not be used.

**UV/DUAL IR**

This detector is not affected by any of the sources mentioned above. They are used in aircraft hangers, generator rooms (diesel and gas turbines) and paint works.

**TRIPLE IR**

The triple IR flame detector is also fast reacting but is also tolerant of fumes, vapours, steam, dust and mist, while being unaffected by the phenomena listed above. It may, however, be affected by modulated IR radiation. Triple IR flame detectors are used in waste handling, colour printing and paper manufacturing.

\* Full a full list of applications for Apollo Flame Detectors, please refer to PP2409, available on request.

**PROTOCOL COMPATIBILITY**

The detectors operate only with control equipment using the Apollo XP95 or Discovery digital protocol (or any development of it).

**PROTOCOL USAGE**

Output Bits	
2	LED
1	Test
0	Remote LED
Interrupt	No
Analogue Value	
Quiescent	25
Alarm	55–64
Fault	4
Input Bits	
2	LED confirmed
1	Test confirmed
0	Remote LED confirmed
Flag Setting	
XP95 Flag	Yes
Alarm Flag	Yes

Table 1

**ELECTRICAL CONSIDERATIONS**

The detectors are loop powered and need no external supply. A remote LED alarm indication may be connected to the flame detector.

**Dimensions**

100mm x 40mm (Detector only)  
100mm x 48mm (Detector and base)

**Weight**

Detector 150g  
Detector and base 210g

**ACCESSORIES**

A portable Flame Detector Test unit is available, part number 29600-226.

Adjustable mounting bracket, part number 29600-458 (comes complete with Deckhead Mounting Box).

Deckhead Mounting Box, part number 45681-217.

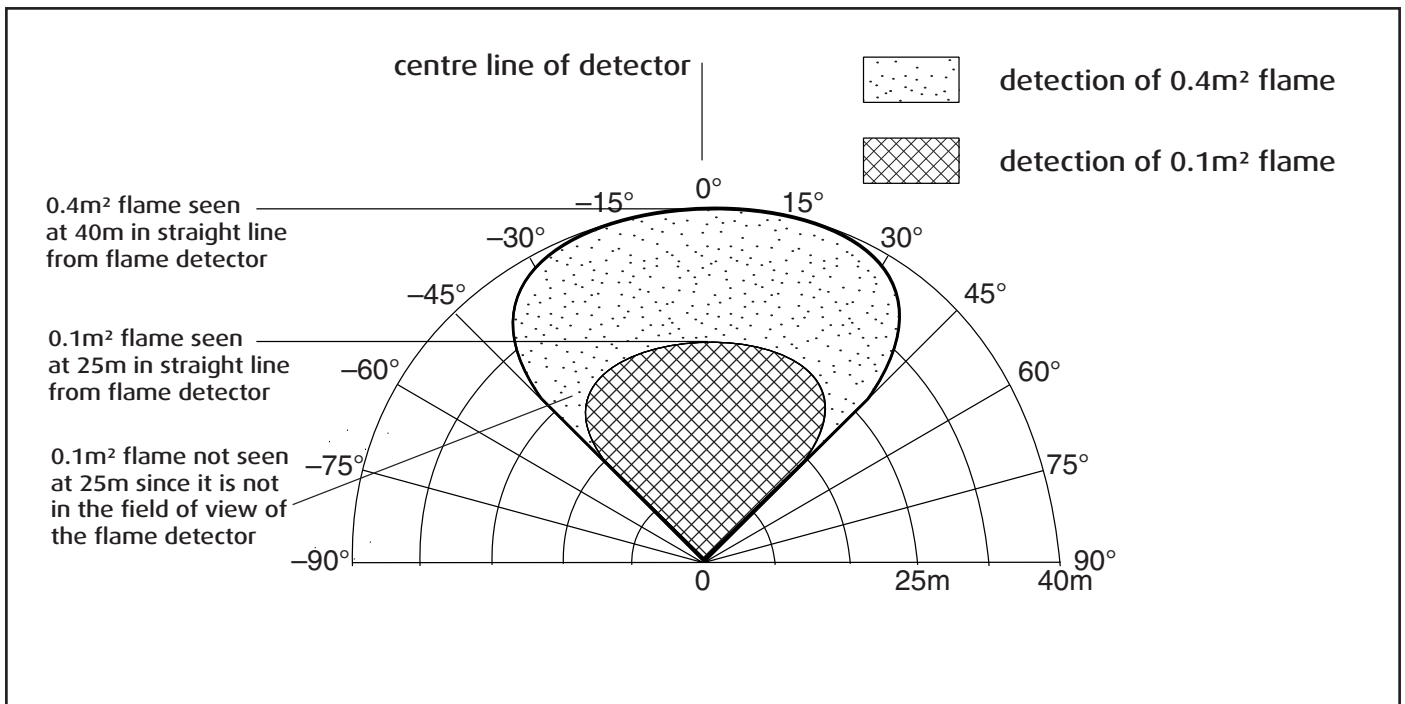


Fig. 1 Field of View

The field of view of the flame detector is shown in Fig. 1. This also provides information on the size of fire detectable at various distances.

The Flame Detectors can also be ceiling mounted, positioned above the anticipated flame source or at the centre of the area to be protected, perpendicular to the floor below. If the detector cannot see the whole of the area to be protected, one or more additional detectors may be required. Refer to the angle of view diagram Fig. 2 to establish the detector performance. The area of detection is dependent on the detectors height above the likely source of flame. The detector has a 90° conical field of view or 45° either side of the viewing axis centre line. The maximum ceiling height is 20m. If the detector is perpendicular to floor and at a height of 10m then the detector will view a circular floor area below with a 10m radius (20m diameter circle).

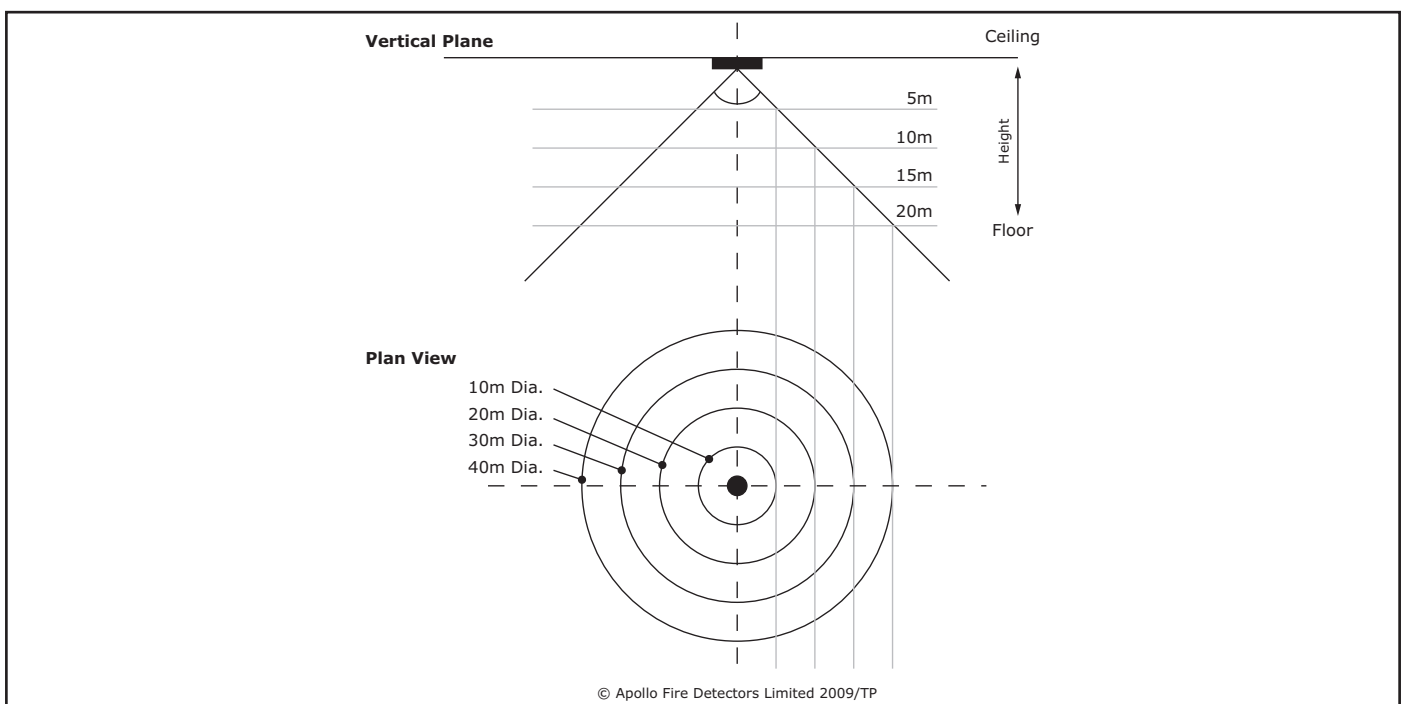


Fig. 2 Ceiling mounting example

**TECHNICAL DATA**

	<b>UV</b>	<b>UV/Dual IR</b>	<b>Triple IR</b>
Supply Voltage	17–28V DC	17–28V DC	17–28V DC
Protocol Peak to Peak	5–9V	5–9V	5–9V
Quiescent Current	2.3mA	2.8mA	2.5mA
Alarm Current	4.2mA	4.2mA	4.2mA
Surge Current	9mA (peak) for 110ms	9mA (peak) for 85ms	9mA (peak) for 85ms
Maximum Power Up Time	4 seconds	4 seconds	4 seconds
Remote Output Characteristics	Connects to positive line through 4.5k $\Omega$ (5mA maximum)	Connects to positive line through 4.5k $\Omega$ (5mA maximum)	Connects to positive line through 4.5k $\Omega$ (5mA maximum)
Operating Range	0.1m <sup>2</sup> n-heptane at 25m	0.1m <sup>2</sup> n-heptane at 25m	0.1m <sup>2</sup> n-heptane at 25m
Sensitivity	Class 1 or 3, EN54-10	Class 1 or 3, EN54-10	Class 1 or 3 EN54-10
Field of View	90° Cone	90° Cone	90° Cone
Spectral Response	UV 185 to 260nm	UV 185 to 260nm, IR 0.75 to 2.7 $\mu$ m	0.75 to 2.7 $\mu$ m
Operating Temperature	–40°C to +70°C (no condensing or icing)	–40°C to +70°C (no condensing or icing)	–40°C to +70°C (no condensing or icing)
Storage Temperature	–40°C to +85°C	–40°C to +70°C	–40°C to +70°C
Relative Humidity	95%, non–condensing	95%, non–condensing	95%, non–condensing
IP Rating	66	66	66
Materials			
Housing	White Polycarbonate, V-0 rated to UL94	White Polycarbonate, V-0 rated to UL94	White Polycarbonate, V-0 rated to UL94
Sensing window	2mm Quartz	2mm Quartz	2mm Float Glass
Terminals	Nickel plated stainless steel	Nickel plated stainless steel	Nickel plated stainless steel
Isolator Count			
20D	7	7	7
20i	20	20	20