

# XP95 OPTICAL SMOKE DETECTOR



XP95 Optical Smoke Detector ▲ Part Number 55000-600/620/660

## OPERATING PRINCIPLES

The XP95 optical detector uses the same outer case as the ionisation smoke detector and is distinguished by the indicator LED which is clear in standby and red in alarm. Within the case is a printed circuit board which on one side has the light proof labyrinth chamber with integral gauze surrounding the optical measuring system and on the other the address capture, signal processing and communications electronics.

An infrared light emitting diode within its collimator is arranged at an obtuse angle to the photo-diode. The photo-diode has an integral daylight-blocking filter.

The IR LED emits a burst of collimated light every second.

In clear air the photo-diode receives no light directly from the IR LED because of the angular arrangement and the dual mask. When smoke enters the chamber it scatters photons from the emitter IR LED onto the photo-diode in an amount related to the smoke characteristics and density. The photo-diode signal is processed by the optical ASIC and passed to the A/D converter on the communications ASIC ready for transmission when the device is interrogated.

## ELECTRICAL DESCRIPTION

The 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 4mA at 5V may be connected between the +R and -R terminals. An earth connection terminal is also provided.

When the device is energised the ASICs regulate the flow of power and control the data processing. The optical ASIC is controlled by the communications ASIC and pulses the IR LED. The signal from the photo-diode is processed by the optical ASIC and transferred to the communications ASIC where it is then stored. When smoke enters the chamber the photo-diode signal increases. The information to the A/D converter is updated once per second or when either the monitor or the preceding address is interrogated. Whenever the device is interrogated this data is sent to the control equipment. EN54 threshold alarm levels are calibrated within the processing ASIC. If the device is not addressed within one second of its last polling and the analogue value is greater than the EN54 alarm level the

alarm flag is initiated and the device address is added to the data stream every 32 polling cycles from its last polling for the duration of the alarm level condition, except when the alarming device is being interrogated. This can provide a location identified alarm from any device on the loop in approximately two seconds.

The detector is calibrated to give an analogue value of  $25 \pm 7$  counts in clean air. This value increases with smoke density. A count of 55 corresponds to the EN54 alarm sensitivity level. See Fig. 9.

## ENVIRONMENTAL CHARACTERISTICS

The XP95 optical smoke detector is unaffected by wind or atmospheric pressure and operates over the temperature range  $-20^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$ . See Fig. 10.

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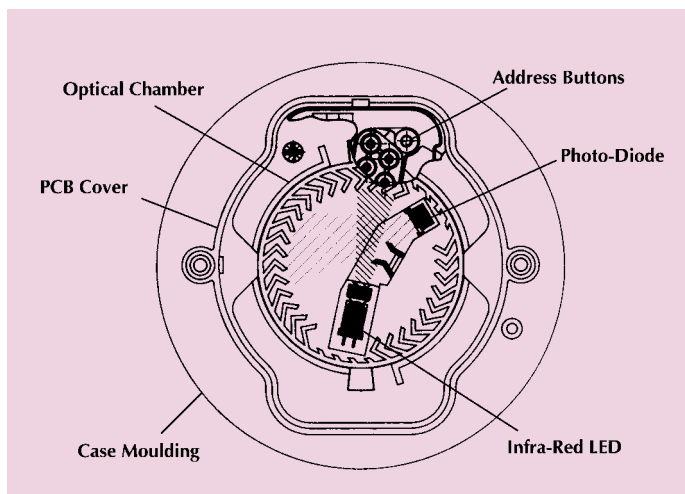


Fig.7 Top section - XP95 Optical Smoke Detector

## TECHNICAL DATA

**XP95 Heat Detector  
(Standard)**  
**Detector Part No**  
**55000-400/420**  
**Base Part No 45681-210**

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

**Detector Type:**

Point type heat detector for  
fire detection and fire alarm  
systems for buildings

**Detector Principle:**

Linear approximation over  
temperature range 25°C to  
90°C

**Sensor:**

Single NTC Thermistor

**Sampling Frequency:**

Continuous

**Sensitivity:**

25°C to 90°C: 1°C/count.  
-20°C returns 8 counts

**Supply Wiring:**

Two wire supply, polarity  
insensitive

**Terminal Functions:**

L1&L2 supply in and out  
connections (polarity  
insensitive)  
+R remote indicator  
positive connection  
(internal 2.2k $\Omega$   
resistance to supply  
+ve)  
-R remote indicator  
negative connection  
(internal 2.2k $\Omega$   
resistance to supply  
- ve)

**Supply Voltage:**

17 to 28 Volts dc

**Modulation Voltage at  
Detector:**

5 to 9 Volts peak to peak

**Quiescent Current:**

250 $\mu$ A average, 500 $\mu$ A peak

**Power-up Surge Current:**

1mA

**Duration of Power-up Surge  
Current:**

0.3 seconds

**Maximum Power-up Time:**

4 seconds

**Analogue Value at 25°C**

25 $\pm$  5 counts

**Alarm Level 55 Counts:**

55°C when measured under  
static conditions

**Alarm Indicator:**

Red light emitting diode (LED)

**Alarm LED Current:**

2mA

**Remote LED Current:**

4mA at 5V (measured across  
remote load)

**Storage Temperature:**

-30°C to +80°C

**Operating Temperature:**

-20°C to +70°C

**Humidity:**

(No condensation)

0% to 95% relative humidity

**Wind Speed:**

Unaffected in fixed  
temperature use

**Atmospheric Pressure:**

Unaffected

**Vibration, Impact & Shock:**

To EN54-5:2000

**Electro-magnetic  
Compatibility:**

See page 22 for full details

**IP Rating:**

53

**Approvals & Regulatory  
Compliance:**

See page 22 for full details

**Dimensions:** (diameter x height)

Detector: 100mm x 42mm  
Detector in Base:  
100mm x 50mm

**Weights:**

Detector: 105g  
Detector in Base: 157g

**Materials:**

Detector Housing: White  
polycarbonate V-0 rated to  
UL 94

Terminals: Nickel plated  
stainless steel

**XP95 High Temperature  
Heat Detector**

**Detector Part No:**  
**55000-401**

Specifications are the same  
as those for the standard  
detector, apart from the  
following points:

**Detector Principles:**

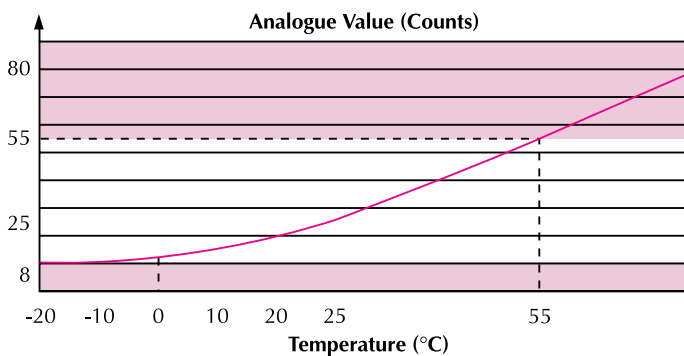
Linear approximation  
designed to give 25 counts at  
25°C and 55 counts at 90°C

**Sensitivity:**

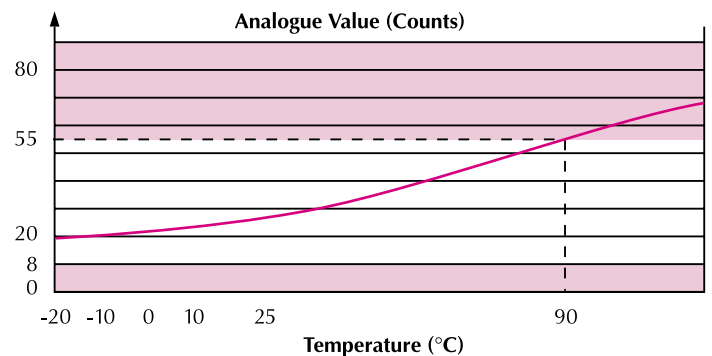
25°C to 90°C: 2.17°C/count  
-20°C returns 20 counts.

**CE**  
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# technical data



**Fig.13** Typical response characteristic - XP95 Standard heat detector



**Fig.14** Typical response characteristic - XP95 High temperature heat detector