Infra red detectors – Frequently asked questions

What applications are infra red detectors used for?

Infrared detectors are used in a wide range of applications but include:-

- **Non Contact temperature sensing**
- **Infra red gas analysis**
- **Flame detection**
- **Temperature control systems**
- **Detection of human presence**
- **Infra red spectroscopy**

Infra red detection is used in many every day events and can now be found in the home, car and shopping malls. In fact wherever we go infra red detection can be found.

Some examples of applications:-

Non Contact Temperature sensing-

The traditional temperature measuring device is a temperature probe such as a thermocouple which is a contact measurement device so by immersing the probe tip in the object you are able to measure the temperature.
Infra detectors allow you to **remotely** detect the temperature at the surface of the object so can be used for any industrial application where contact temperature sensing is not possible or desirable.

Infra red gas analysis-

Most gases emit in the infra red wavelength which makes infra red detectors ideal for detection of a wide range of gases. An example is Co2 emissions from motor vehicles.
Different types of gases can be detected by using either different detectors or the same detector with multiple elements.

Flame Detection:-

Infra red detectors are used to measure the infra red from flames. These can be used in industrial systems or as safety systems in military applications.

Temperature control systems:-

Infra red detectors can be used in industrial systems to protect plant and machinery by detecting over heating of components. This type of system can help protect equipment from permanent damage.

Detection of human presence:-

Most of us are aware of infra red detectors being used in intruder alarms in our homes and offices. Also the police use infra red imaging to detect and track people in the dark and the fire brigade use infra red cameras to detect the presence of humans in major catastrophes such as collapsed buildings etc.

Infra red spectroscopy

The use of infra red detection is used to measure many compounds found in food stuffs for example and by being able to accurately measure constituents of food stuffs infra red spectroscopy can help ensure the food we eat is to the correct specification.

How do I select the right infra red detector for my application?

The guide lines to selection can be as follows:-

What wavelength of infra red is my object emitting?

In some cases this can be very specific eg: gas detection, human body and sometimes it can be broad as in infra red spectroscopy. The detector you use must have the inherent capability of measuring the wavelength of interest. Here are some of the most popular types of Infra Red detectors used and their wavelengths:-

PbS – Lead Sulphide	1-3 microns
PbSe – Lead Selenide	2-5 microns
Thermopiles -	from UV – to far infra red
MCT	2-14 micron
InSb	5-18 micron

Why does the detector need to be fitted with a window?

While a detector may have a wide band of response say for example thermopiles. The detectors response can be tailored by the correct window fitted to the detector. Sometimes these windows can be very broad as in the case of an 8 -14 micron germanium window but other times they can have a very narrow band and tailored to respond to a specific gas peak for example.

There are many different types of windows but here are some of the most popular.

KBr – Potassium Bromide- High transmission, response from 1 to 40 micron, Caution: Very soluble if attacked by moisture

Silicon – Low cost material, low transmission but very durable

AR coated Germanium- High transmission over the 8 -14 micron region with anti reflective coating.

CaFl – Calcium fluoride- very high transmission material to about 10 micron

Sapphire

CsI- Cesium Iodide- very hard material with good response into the far infra red

Do detectors vary in frequency response?

Yes

You have to decide the frequency of response required. Some detectors can be pulsed thousands of times a second like PbS/PbSe detectors while others like thermopiles for example are designed for DC or low frequency operation.

What information do you need form the device?

You have to be clear about what information you require from the detector. Do you just want a go/no go device such as an intruder alarm where someone is present or not. Do you need to discriminate between two levels for example in gas detection where you may want to measure the presence of two gases with the same detector? Or do you want accurate measurements such as infra red spectroscopy where you may need to know not only if a specific constituent is present but you also how much, such as fat in milk, for example.

While there are no set rules as to the type of detector to be used for an application you need to consider these issues very carefully then speak to one of our technical staff on 01635 30345.