PTIR

The environmentally friendly alternative to ionisation

SYSTEM SENSOR®

The world's finest manufacturing facility

System Sensor's European products are researched, designed and manufactured at our 10,000m² state-of-the-art facility in Trieste, Italy. Quite simply, it's the best of its kind. Advanced technology and manufacturing processes coupled with dedicated staff ensure precision manufacturing and incomparable quality control. And 100% testing ensures that nothing leaves our doors unless it's in perfect working order and capable of providing years of trouble-free protection.

We complement this unique offering with a global network of fire systems integration and distribution partners who serve end-users, consulting engineers and specifiers in more than forty countries. All share in our business expertise and, of course, our passion for perfection.

Moving the goalposts in the core detector space

Improvement in speed and reliability of detecting actual fires and reduction of false alarm rates has been the goal for the fire industry for many years. The ionisation smoke detector is acknowledged as the most effective technology, combining good all-round performance with realistic costs. Originally developed in 1941, it has been the foundation stone for today's global life safety industry but has a fundamental weakness in being based on a radioactive source.

An increasing number of flammable modern materials used in everyday items generate a fast flaming high energy fire with the most effective technology for the rapid detection being the 60 year old ionisation technology. The photo electric optical detector, the default choice for the majority of applications today, is less efficient than ionisation technology at detecting the small particles of combustion generated by a fast-developing fire.

To address this imbalance, multi-sensor detectors combine an optical smoke detector with a thermal sensor, with the resulting multi-criteria detector achieving a noticeable performance improvement in responding to fast developing alcohol or fuel fires over the stand-alone optical, but its speed of response still fell well short of the ionisation detector.

With the environmental impact of the disposal of such devices becoming a significant issue, an environmentally friendly replacement for the radioactive Ionisation technology is required.

PTIR, the unique alternative to ionisation technology

The new Photo Thermal Infra Red detector, PTIR, is the environmentally friendly high performance detector that detects fast flaming fires as rapidly and effectively as an ionisation device, whilst out-performing its false alarm immunity. PTIR moves the goalposts in false alarm immunity, fire detection performance and environmental benefits in the core point detector space.

PTIR consists of independent photoelectric, thermal and infrared sensors, managed and controlled by the IDEA™ algorithm. The addition of the IR sensor to the established photo-thermal multi-sensor design increases the unit's performance to the point where it can be used to replace the environmentally unfriendly ionisation detector. It provides increased false alarm immunity without any degradation in speed of response.

The addition of the unqiue IR sensing element to the established photo-thermal multi-sensor design provides analysis of three of the four elements present during the development of any fire: heat, particulate matter and a changing light signature. It's the Infra Red sensing element which makes PTIR unique. The addition of the third sensor is a first and, by detecting another element of a fire rather than improving the performance of the smoke chamber, you get improved detection and false alarm immunity.

The IDEA™ Algorithm

Integrating a 3rd sensing element into a device is relatively straightforward. The Intelligent Design Evolutionary Algorithm is the really clever part. The on-board intelligence running the IDEA™ dynamically adjusts the detection profile of the device in response to the inputs from the sensors, enabling it to be re-characterised automatically as the ambient conditions change. Based upon the sensor signals, the IDEA™ dynamically changes the sensor thresholds, changing sensor gain, changing time delays, changing combination, changing sampling rates, changing averaging rates and, if any sensor fails, changing sensitivity of the remaining sensors as well as indicating a fault condition.

Putting the environment first

Environmental factors are influencing the choice of detector, and they are weighted heavily against the radioactive ionisation technology. Approval, transportation and free movement of radioactive sources, and therefore ionisation detectors, are all issues to be considered. In most countries, it is becoming harder to obtain approval for an ionisation detector and the regulations surrounding the transportation of radioactive materials are becoming more stringent and consequently more expensive. These two factors are rightly driven by ecological concerns and it is sensible that the use of products incorporating radioactive sources should be discouraged where a true alternative exists. Now there is a technical replacement to the ionisation technology, it can now be retired.

The routine maintenance and cleaning requirements for detectors must also be considered. All smoke detectors, whether ionisation or photoelectric, require periodic cleaning in order to maintain their sensitivity and reduce false alarms. With a photoelectric detector, this is easily achieved by disassembly and blowing air, brushing or washing the parts until they are clean. This cannot be done with an ionisation detector because for health and safety reasons access to the radioactive source is restricted.

PTIR, in common with all System Sensor devices, is an environmentally friendly detector, meeting the WEEE and RoHS legislative requirements even though they are not mandatory in the fixed installation fire industry. By not using any environmentally hazardous materials, the widespread adoption of the PTIR as a high performance replacement for the ionisation detector will immediately reduce the amount of hazardous material contaminating an increasingly fragile world.

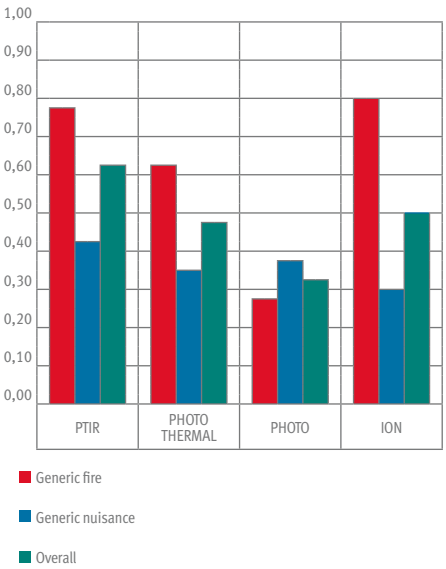
Performance

During extensive testing, ionisation, PTIR, photo-thermal, optical and ion detectors were exposed to the full array of fire types and a wide range of common causes of nuisance alarms. The testing demonstrated conclusively, that PTIR is a functional alternative to the ionisation technology in detecting fires, and has improved performance in the rejection of spurious alarms. It also significantly out-performs all alternative technologies in both fire detection and rejection of spurious alarms.

The IDEA™ algorithm is the key to PTIR's performance. The whole purpose of the complex algorithms is to maximise the detector's performance in detecting an actual fire, while simultaneously reducing the possibility of false alarm generation. The algorithm takes the information from the three independent sensors and uses the instantaneous output levels relative to the individual alarm thresholds to assess the situation at any specific time.

If only the infrared sensor goes into alarm, the signal is never passed to the panel because it is impossible for a real fire to generate light without either heat or particulate matter also being present. The most likely source of such a signature is welding, a well-know and often difficult to ignore source of false alarms.

Performance test summary



Specification

Operating voltage:	15 – 32 vDC
Typical stand-by current @ 25°C:	200µA at 24 vDC
Maximum alarm current:	7mA at 24 vDC
Operating temperature range:	-20°C to 55°C
IR sensing limits:	0 – 450 uW/cm²
Colour finish:	Pantone Warm Grey 1C
Compatible bases:	All 500 Series bases
Sensitivity settings:	
Alarm 1 – PTIR	Low false alarm resistance, high photoelectric only sensitivity
Alarm 2 – PTIR	Medium false alarm resistance, medium photoelectric only sensitivity
Alarm 3 – PTIR	Standard false alarm resistance, low photoelectric only sensitivity
Alarm 4 – PTIR	High false alarm resistance, low photoelectric only sensitivity
Alarm 5 – PTIR	Very high false alarm resistance, low photoelectric only sensitivity
Alarm 6 – Thermal Only	Class A1R Thermal Only

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