



## ↳ FUSION REACTION

Just released by Bosch is a range of sensors incorporating Sensor Data Fusion, a technology that employs a combination of smart design and digital signal processing to significantly increase the reliability and performance of the company's alarm sensors.

**O**VER the past 6 months it's become clear that there's new pressure in the alarms market to offer users and installers more than just sharp prices. The latest generation of sensors is delivering real intelligence and Bosch's Sensor Data Fusion technology, incorporated into the company's Professional Series detector, is a case in point.

If you're thinking that Sensor Data Fusion is another word for digital signal processing, you're partly right. But there's more to it than that. Clever new design serves up the DSP information never available before. Bosch's Sensor Data Fusion takes the signals from all a sensor's data gathering devices and analyses them simultaneously. This allows the sensor to make on the spot decisions other sensors would not be able to manage.

In essence, Sensor Data Fusion turns Bosch's top of the range Professional Series detectors into a 5-technology sensor. At any given moment the DSP is analysing the detector's long range PIR, its short range PIR, its white light sensor, its temperature

sensor and its microwave sensor.

Bosch says the combination of long and short-range PIRs offers an increase in resolution while microwave input is handled by range adaptive Doppler radar. The other 2 data inputs come from dynamic temperature compensation and active white light suppression.

This configuration allows Sensor Data Fusion to ignore potential causes of false alarms like headlights or torches – when lights sweep the sensor the processor picks up on simultaneous heat and light signals and ignores them. The strength of this process is that it does not seek to mask signals like light or heat using filtration. Instead these signals are received without attenuation – the result is cleaner performance across the board.

Installers who are reading carefully will have noticed something different about these new Bosch sensors straight away. Yes, that's right – they have both long *and* short range PIR elements and the new sensors are designed this way in order to give the DSP a sense of perspective.

In the past, mirror optic lenses have been used to provide some perspective but Bosch believes its new technology is superior. Using standard PIR pyros and lenses, a warm-blooded creature like a mouse will appear the size of an elephant if it's close enough to the sensor.

But with Sensor Data Fusion, the short range sensor picks up the signal while the long range PIR does not. As a result, the microprocessor wicks up the microwave sensor's detection threshold – adjusting it on the basis of information received from the 2 PIRs. As a result the mouse will appear tiny in the microwave's field of detection, the alarm threshold won't be exceeded and the sensor will not activate an alarm.

This might not sound like much but it is. Traditional PIRs and dual techs we've walk and crawl tested in the past have had weakness in these areas that either lead to false alarms or allow a patient intruder to defeat them by moving carefully either at the extremity of their range or in close.

Bosch goes so far as to claim its Sensor Data Fusion Technology can distinguish between a fly at .03 metre and a person at 15 metres – this is important because other sensors are unable to do so.

Another strength of Sensor Data Fusion technology is its ability to handle increasing temperatures. In the past, as temperature has climbed in a detection environment, the sensor has

“If you're thinking that Sensor Data Fusion is another word for digital signal processing, you're partly right. But there's more to it than that”





wound up its gain – essentially making the sensor more and more sensitive as the temperature increased. This would be fine if temperature was the only potential cause of false alarm but it's not. Cranking up sensor gain simply means the detector is operating on a hair trigger – any small thing will set it off.

With Sensor Data Fusion Bosch employs a different method. At first, as temperature climbs, the gain increases in the usual way. But once room temperature reaches 33.3 degrees C, the level most likely to be emitted by an intruder's skin or clothing, Sensor Data Fusion uses information from the 2 PIRs to ramp up signal-to-noise ratio in a narrow temperature band around 33.3 degrees. At the same time, sensor gain is wound back in order to decrease the chance of false alarms.

Another element of Sensor Data Fusion sensors is Tri-Focus Fresnel optics. We're all used to mirror optics being top of the tree but Bosch has taken the venerable Fresnel lens to the next level. The reason for this is partly decreed by the fact these sensors have dedicated pyro electric elements for long and short-mid range duties. Along with a lens each for the PIRs, there's also a look-down lens. These lenses are optimized for the best possible performance – each lens designed to do a different job – the top lens is long range and the lower handles short range.

Supporting these lens options are dipswitch settings that allow installers to adjust PIR coverage range from 8 to 15 metres. Dipswitch selectable coverage settings are a nice feature given most



“The Pro Series is designed to manage its own installation in a way that protects components from the stresses of application”

sensors need their lenses changed if you're looking to trick them up for anything other than standard performance.

For installers there are some other neat features. For a start you get flexible mounting height – between 2 and 3 metres with no adjustment. There's also a built in spirit level. It's narrow so accuracy is an approximation but it's a very useful tool when you at the top of a ladder with a drill in one hand – making installing the sensor chassis easier, faster and tidier.

Another really neat feature of the Pro Series detectors is the look-down window – in most sensors this is activated by a piece of tape. You pull the tape and as it comes away it exposes a lens that gathers signal from underneath the detector. Trouble is, once this tape is removed, you can't replace it. With the new Bosch units, there's a flap and this flap can be opened or closed as often as you like depending on the changing needs of the application.

According to Bosch's Adam Harris, the Pro Series is designed to manage its own installation in a way that protects components from the stresses of application. The sensor's back board is installed first with the circuit board complete with detection elements attached afterwards.

The reason for this, says Harris, is that Bosch's bench testing has discovered many traditionally designed sensors fail because their PCBs are grazed or stressed during installation.

There are 2 sensors in the Professional Series range – the ISC-PPRI-W16 is a dual PIR sensor, while the ISC-PDL1-W18 is the top of the line unit, offering the twin PIRs along with range adaptive microwave radar. With their smart features, long warranties and very sharp prices, these new Bosch detectors are well worth a closer look. ▀▀▀