The choice between intelligent or conventional fire detection technology by

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The choice of fire system technology is relatively straightforward at the two extremes: conventional systems are normally more than adequate in small installations, while addressable systems are the norm in large premises. The most difficult choice to be made between conventional and addressable systems lies somewhere in the middle, where both could be applicable. This boundary is not a fixed point; it has steadily fallen as lower cost computing power has made the addressable systems. In 1990, the boundary was above twelve fire zones; by 1995, it had fallen to eight to ten zones; today it is around six zones.

The recent past has seen development effort from the majority of smoke detector manufacturers concentrated on their addressable product ranges. Addressable fire systems offer distinct advantages over conventional ones, particularly in larger and more complex installations, where the installer, the building's occupants and the emergency services all benefit from the inherent sophistication, increased functionality and discriminatory abilities of an addressable system. Technology advances have benefited the mid-range sector, driving down the financial and application complexity barriers between a conventional and an addressable system. However, despite the improved cost-effectiveness, and consequent increased penetration of addressable systems, a large number of traditional conventional systems, without the features that can contribute to a higher level of false alarm immunity, are still being installed. Some major manufacturers have now turned their attention to enhancing the functionality of the conventional detector, incorporating many of the advanced features previously only provided in an addressable unit.

To go back to fundamentals: the primary purpose of a fire system is to detect a fire and subsequently warn the premises' occupants and the Fire and Rescue Service; by providing as early a warning as possible, the occupants have the best chance of avoiding injury and damage to the building will be minimised. As our understanding of fire has grown over the years, so fire systems have become more sophisticated, with different detection methods characterised to particular sorts of fire. All detector developments are intended to improve the speed of response to a real fire without increasing the frequency of false and nuisance alarms.

The total installed cost of a fire system is heavily dependent on the size of the installation. As a general rule of thumb, in systems with more than six fire zones, an intelligent system is more cost effective, because the higher cost of the addressable detectors and control panel is more than offset by reduced installation costs and ongoing service benefits. By enabling both detectors and sounders to be connected on the same loop, the wiring requirements are reduced even further, a significant factor in large or multi-floor buildings. In such larger systems, not only is the initial cost of installation lower, but also the functionality of the system is increased. Control panels can normally be networked, either in a peer-to-peer or master-slave configuration, enabling one system to monitor large and multi-building sites. The fire system can also be more closely integrated with other building service systems such as security, access control, environmental control, heating and lighting.



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The increased functionality of an addressable fire system results in five main advantages for the user and the emergency services.

1 Since each detector is assigned a unique address, the location of the fire can be identified with great precision, enabling the incipient fire to be dealt with as quickly as possible by the building's designated staff.

If the incident

is sufficiently serious to require the attendance of the emergency services, the fire alarm control panel can provide a meaningful location text message, describing the position of the fire for firefighters who are almost certainly unfamiliar with the details of the building's layout.

By optimising the allocation of specific device addresses to



fire groups, zoned warnings and evacuation signals can be broadcast. By timing the fire warnings to different areas of the building, panic can be minimised and the flow of people through the emergency exits can be more readily managed.

4 The increased sophistication of the detectors with adjustable sensitivity, multi-sensor devices and the use of advanced algorithms have all contributed to a reduction in false alarm rates without the system's ability to respond to a

real fire being compromised. As an additional benefit, the system can be automatically reconfigured with different day/ night profiles to provide the highest degree of protection during times when the building is unoccupied.

5 While they are no substitute for regular testing and maintenance, drift compensation, "maintenance required" indicators and similar adjustments to the detectors' settings will all help to keep the operational parameters within specification during the lifetime of the system. Intelligent detectors also offer full monitoring of the internal operation of each detector, making them inherently more reliable and enabling action, that might otherwise have gone unnoticed, to be taken at any individual point in the fire zone.



On the other hand, a conventional smoke detector was historically the equivalent of a simple on-off switch with a single, factory-preset alarm threshold. It was impossible to characterise the device to its location by adjusting the threshold, and, in reality, the only lower sensitivity option was a fixed or rate of rise thermal device. The latest generations of conventional detector incorporates intelligence

in the head, providing users and installers with features and capabilities previously only found in more

complex addressable detectors. True multi-sensor conventional devices, in which the alarm signals from the optical and the thermal sensors are continually monitored by the internal processor, are now widely available, and the provision of installer-friendly features, such as remote interrogation and test, also reduce the total system cost.





One manufacturer has developed two remote tools for use with its latest conventional family. The simpler tool is the laser test unit, effective over a range of three metres. The engineer stands on the ground – no ladders, towers or poles are needed - and directs a modulated laser beam at the detector. The detector latches into alarm, enabling the system to be checked in the normal way. The more sophisticated remote programmer unit offers much increased functionality, enabling read/write the last maintenance date, read chamber contamination level and thermal



element value, select alarm threshold, programme device address and alarm test to be carried out. The programmer unit interfaces with the detector either by using its visible light transmission mode, a relatively short-range option, or alternatively by using its radio communication mode, which gives an effective range of typically eight metres. –

With the introduction of the latest generation of conventional detectors, specifiers have a much better choice between conventional and addressable systems in the small to mid-size installation, enabling many of the features of a full addressable system to be provided in a lower cost conventional system.

Notes to Alex and James 28 January 2005.

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System Sensor Europe is the world's largest manufacturer of smoke and thermal detectors for use in conventional and addressable fire detection systems.

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