AIR Intelligence™

ASPIRATED SMOKE DETECTION

THE INTELLIGENT SOLUTION FOR ASPIRATED AIR SAMPLING

AIR Intelligence

ASPIRATED AIR SAMPLING TECHNOLOGY

Aspirated Air Sampling is a method of Smoke Detection where the air from the protected area is actively drawn through a network of sampling pipes, passed through a central detection unit and sampled for presence of smoke. Based on a patented 'forward scatter' system, the unit directs a powerful semiconductor laser through an aperture in a specially designed reflector. Any combustion products present in the moving air sample scatter light on the reflector from where it is focused on a single photo-receiver.

While perfectly clean air produces a very small amount of scatter, as the volume of particles below a specific size increases, the amount of light scatter increases. Measuring the amount of scatter gives a measure of the volume of impurity in the air – which in itself is directly related to the size of the fire.

Relative to other methods, forward scatter laser technology has the advantage of significantly earlier detection. Other advantages include inherent immunity to dust / dirt build-up, high signal to noise level and resistance to problems caused by vibration and high humidity. The signal from the detection transducer is processed by a unique ClassiFire-3D® Perceptive Artificial Intelligence system which continually adjusts the detector sensitivity to maintain a consistent level of performance. The detector's patented 'waste-gate' system samples a fraction of the air while bypassing the rest thereby maximizing service life and permitting operation in diverse environments.

Since AIR-Intelligence detectors can have as many as 100 sampling ports on a single pipe network, installation and life cycle costs are often considerably lower than other detection technologies.

AIR-Intelligence ASD-640
Aspirated Smoke Detector

AIR Intelligence™

Products

AIR-Intelligence ASD-160H

- Single pipe inlet
- Up to 2500 sq. ft
- Up to 164 ft. pipe length
- Up to 10 sample ports
- Four alarm thresholds
- SenseNET Network ready
- Direct PC connect

The AIR-Intelligence ASD-160H provides high sensitivity smoke detection in a smaller package for localized applications. ClassiFire™ Perceptive Artificial Intelligence ensures that the detector operates at optimum sensitivity for the protected environment without the need for complex setup.

The ASD-160H ships with 'Fault' and 'Fire' relays and an optional Input Relay Card provides four levels of alarm, fault and three programmable remote inputs. Networkable through SenseNET™ or the Command Module. The detector is housed in a rugged metal enclosure.

AIR-Intelligence ASD-320

- Two pipe inlets
- Up to 10,000 sq. ft
- Up to 328 ft. pipe length
- Up to 50 sample ports
- Four alarm thresholds
- SenseNET Network ready
- Direct PC connect

The AIR-Intelligence ASD-320 provides high sensitivity smoke detection in a medium size package for small to medium applications. ClassiFire Perceptive Artificial Intelligence ensures that the detector operates at optimum sensitivity for the protected environment without the need for complex setup.

The ASD-320 ships with 'Fault' and 'Fire' relays and an optional Input Relay Card provides four levels of alarm, fault and three programmable remote inputs. Networkable through SenseNET or the Command Module. The detector is housed in a rugged metal enclosure.

AIR-Intelligence ASD-640

- Four pipe inlets
- Up to 20,000 sq. ft
- Up to 820 ft. pipe length
- Up to 100 sample ports
- Four alarm thresholds
- SenseNET Network ready
- Direct PC connect

The AIR-Intelligence ASD-640 provides high sensitivity smoke detection for medium to large applications. ClassiFire Perceptive Artificial Intelligence ensures that the detector operates at optimum sensitivity for the protected environment without the need for complex setup.

The ASD-640 ships with 'Fault' and 'Fire' relays plus three programmable remote inputs. Networkable through SenseNET or the Command Module. The detector is housed in a rugged metal enclosure. An optional plastic enclosure is also available.

AIR-Intelligence ASD-Ex

- Explosion proof
- Up to 2500 sq. ft.
- Up to 164 ft. pipe length
- Up to 10 sample ports
- Four alarm thresholds
- SenseNET Network ready
- ATEX rated
- Lightweight design
- Direct PC connect

The AIR-Intelligence ASD-Ex is designed to provide reliable very early warning smoke detection in potentially explosive atmospheres. The detector is supplied in a cast aluminum enclosure. All sampling pipes and cables can be connected to the enclosure as a first fix operation, leaving the internals to be fitted during final commissioning. An external filter with housing is provided to simplify maintenance without de-classifying the protected area.

Equipped with 'Fault' and 'Fire' relays. Relay outputs provide a convenient method for remote monitoring by local fire alarm panels or building management systems. Open Protocol available for 3rd party integration.

Products

AIR-Intelligence COMMAND MODULE

- Network management of up to 127 detectors
- Global network display
- Global network programmer
- Multiple configurations
- SenseNET RS-485 communications
- RS-232 for PC interface
- Integral Modbus and BACnet protocol for BMS integration

The AIR-Intelligence Command Module provides a single location display, control and interface option for systems of up to 127 detectors. Provides global programming of all detector functions simultaneously. Multiple configurations are available including an integral detector option, rugged metal enclosure and a 19" rack mount version.

The integral bar graph automatically displays the status of the detector on the network with the highest alarm level to identify potential problem areas. Integral 'Fault' and four 'Alarm' relays provide global detector output for integration to other systems. Contact monitors enable detectors from alternative manufacturers' to be monitored where necessary.

AIR-Intelligence REMOTE DISPLAY UNIT

- Affordably priced
- 26 bar graph segments
- Four alarm indicators
- SenseNET RS-485 networkable
- Remote relay option
- Wall mount enclosure option
- 19" rack mountable option
- Stratos series compatible

Remote Display Units mimic the display of an AIR-Intelligence detector and provide a means of adding or positioning a graphical display where needed. An unlimited number of RDU's can be associated with a single detector. Interface is via the RS-485 SenseNET bus.

The unit consists of a 3U high metal front panel plate with a graphics overlay and a main PCB which contains terminals for power and RS-485 communications. An optional relay board can be added providing 'Fault' and four 'Alarm' relays at the display unit. Can be rack mounted or housed in a metal wall mount enclosure as shown.

SENSENET™ PC GRAPHICAL SYSTEM MANAGEMENT

- Manages all devices centrally
- Manages 16 x loops of 127 detectors via Command Modules
- Real-time indication of alarms identifiable sound files
- User definable sound files for alarm and fault conditions
- Displays graphical maps with specific instructions
- SiteAudit™ logs all events in real time
- SiteScan™ detects all attached devices for rapid configuration
- SiteMail™ and SitePage™ for automatic email/text alarm alerts
- 4 levels of password protected access
- Full system diagnostics
- Connects to other manufacturers' systems
- Global configuration changes
- Display full system status or historical information at any time

AIR-Intelligence used the latest object-oriented programming technologies to create the SenseNET system monitoring and management tool. The result is a fast, reliable and easy to use program that contains many innovative technologies and features.

SenseNET is a Windows based program that provides central management and monitoring of up to 127 detectors on a fault tolerant communications loop with extensive error checking and correction for the utmost in reliability. For large campus type facilities, up to 16 loops of 127 detectors per loop, can be efficiently monitored.

The ability of SenseNET to produce site maps, warning sounds and provide spoken instruction messages, which may be unique to each detector, is highly beneficial. Detectors may also be grouped together in zones with an associated zone map, allowing alarms and faults to be quickly and easily located.

Applications

WHERE TO USE AIR-Intelligence

There are many instances where a more 'Active' effective and reliable form of detection is required or where 'Passive' point detection is just not suitable. Aspirated Smoke Detection (ASD) offers the best solution to challenging applications, which are often High Risk, High Value, or Mission Critical in nature.

- *Where very early warning detection is required*
- *Where high air flow is present*
- *Where the environment is hostile (very cold, very hot, wet or dusty, strong RF fields)*
- *Where detection is to be concealed for aesthetic or covert considerations*
- *Where there are areas subject to smoke stratification*
- *Where access for maintenance is impractical or impossible*
- *Where reliable detection is required for suppression release*

VERY EARLY WARNING

- *Computer cabinet protection*
- *Computer room protection*
- *Communication facilities*
- *Cleanrooms*
- *Datacenters*
- *Museums*

High sensitivity provided by laser based forward light scatter mass detection and particle evaluation for reliable very early warning detection. AIR-Intelligence particle sensitivity range is 0.003µ to 10µ and boasts the industries widest sensitivity range of 0.00046 to 7.62% obs/ft.

AIR-Intelligence detectors are arguably the most sensitive of its type and can be thousands of times more sensitive than traditional spot-type detection systems.

When such a system is coupled with ClassiFire Perceptive Artificial Intelligence system, an exclusive feature of AIR-Intelligence, it enables the system to provide and maintain the optimum sensitivity without external input, maximizing sensitivity and minimizing nuisance alarms.

HIGH AIRFLOW ENVIRONMENTS

- *Datacenters*
- *Communication facilities*
- *Cleanrooms*
- *Duct detection*
- *Return air monitoring*

With the cooling requirements of modern computing environments, cooling systems producing relatively high velocity air currents challenge traditional detection methods. High air velocity cools smoke from an incipient fire, which has insufficient thermal buoyancy to rise to the ceiling where conventional spot-type detectors reside. AIR-Intelligence actively samples the environment and with its high sensitivity capabilities, can overcome the dilution effect providing reliable very early warning in aggressively high airflow environments.

In these applications, AIR-Intelligence sampling pipe network is often strategically positioned in front of return air grilles with sample ports positioned towards the airflow to capture particulate from an incipient fire as it's transported by the airflow.

HOSTILE ENVIRONMENTS

- *Textile areas*
- *Paper mills*
- *Flour mills*
- *Cold and refrigerated storage facilities*
- *Recycling plants*
- *Contaminated areas*
- *Areas subject to high smoke or dust particulate*
- *Record storage warehouses*

By nature of the system, an aspirated smoke detection system, such as AIR-Intelligence, has no need to be located within the area it's protecting as the environment from the protected area is transported to the detector via a sampling pipe network. This means AIR-Intelligence detectors can be used in areas of extreme temperatures or high humidity.

ClassiFire Perceptive Artificial Intelligence system ensures optimum sensitivity and performance in practically any environment without the need for external adjustment. AIR-Intelligence detectors also incorporate Dust Compensation and Laser Dust Discrimination (LDD^{3}™), providing highly effective smoke detection in dusty, hostile environments with minimum risk of nuisance alarms.

AIR Intelligence™

Applications

CONCEALED DETECTION

- *Heritage buildings*
- *High-end residential*
- *Prison cells*
- *Architectural and design considerations*

Where detection is required for reasons of aesthetic consideration or potential vandalism, it must not be visible or accessible. A continuous air sample can be discreetly drawn via flexible capillary tubes, which are either flush terminated or otherwise concealed in ceiling features.

Capillary sampling provides an effective and affordable means to strategically locate the actual sample port away from the main pipe trunk. Many configurations are possible. AIR-Intelligence offers a wide variety of 'Off the Shelf' remote sample port configurations.

HIGH CEILINGS

- *Atriums*
- *Warehouse and distribution centers*
- *Elevator shafts*
- *Aircraft hangars*
- *Auditoriums*
- *Airport terminals*

Due to the effects of stratification in buildings with high ceilings, it is unlikely that smoke will rise high enough or quickly enough for traditional detection systems to respond. Maintenance access to traditional detection once installed, also pose a problem.

AIR-Intelligence aspirated smoke detection systems utilize a sampling pipe network to actively draw the environment back to a centrally located location. With proper design and strategically located sample ports, the effects of stratification can be overcome and maintenance access simplified. Due to its high sensitivity potential, AIR-Intelligence can also overcome the effects of dilution in large open spaces.

MAINTENANCE ACCESS ISSUES

- *Atriums*
- *Warehouse and distribution centers*
- *Cleanrooms*
- *Ceiling voids and below raised floors*
- *Record storage facilities*
- *Hospitals*
- *Classified areas*

Smoke detectors generally require testing on an annual basis or more frequently depending on jurisdictional requirements. Access for testing and maintenance must be achievable.

This is often impractical for traditional detection technologies in a large number of applications, as access equipment may be necessary or access to the protected area restricted.

Sampling pipe network of an aspirating smoke detection system, such as AIR-Intelligence, transport the protected environment back to a strategically located detector facilitating ease of maintenance, test and inspection.

COMPLEMENTS SUPPRESSION

- *Electrical control rooms*
- *Substations*
- *Datacenters*
- *Server rooms*
- *Equipment cabinets*

AIR-Intelligence provides the earliest warning of a developing condition allowing personnel time to respond, time to avoid the risk of a costly suppression release. As conditions develop, relying on AIR-Intelligence as part of the suppression release sequence provides a reliable means to initiate a release. The detector's auxiliary alarm threshold is often times used for this purpose.

ClassiFire Perceptive Artificial Intelligence system continually ensures optimum reliable sensitivity without the need for external or repeated adjustments.

Technology

AIR-Intelligence is a highly sophisticated 'next generation' of High Sensitivity Aspirated Smoke Detection product that has been designed to ensure that installation and commissioning is as simple as possible, while optimizing performance. AIR-Intelligence series detectors incorporates a patented 'artificial intelligence' known as ClassiFire, which allows the detector to continually optimize its sensitivity ensuring a consistent level of protection in virtually any environment with minimal chance of nuisance alarms.

ClassiFire intelligence also monitors the detector chamber and filter cartridge for contamination, continually adjusting the appropriate operating parameters to counteract the negative effects of such contamination. With its unique award-winning technology, AIR-Intelligence series aspirated detection systems are able to provide superior very early warning smoke detection that can adapt to virtually any environment and to any normal fluctuations within those environments. AIR-Intelligence has proven its worth many times by detecting 'difficult-to-detect' slow growth electrical overload incipient fires in 'difficult' environments.

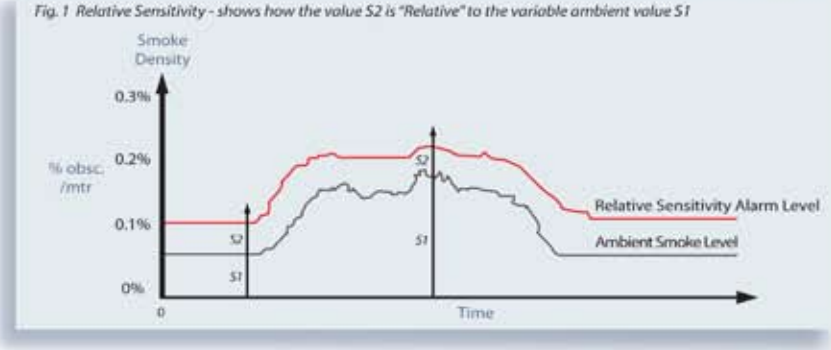
AIR-Intelligence Next Generation Aspirated Smoke Detectors provide unparalleled robust features

- *High sensitivity provided by laser based forward light scatter mass detection and particle evaluation for reliable early warning detection.*
- *Particle sensitivity range: 0.003 to 10 micron.*
- *Industries widest sensitivity range: 0.00046 to 7.62% obs/ft.*
- *Four programmable alarm thresholds (Aux, Pre-Alarm, Fire 1 and Fire 2).*
- *ClassiFire Perceptive Artificial Intelligence system.*
- *Dual Technology LDD 3D3 Laser Dust Discrimination and elimination system.*
- *RS-485 built-in as standard for networking and remote communications. Up to 127 detectors per loop, 4000 ft. between devices.*
- *RS-232 built in for direct PC interface without the expense of high level interface equipment.*
- *Powered by 24-Volt DC regulated supply, low current draw.*
- *Supervised flow sensors, each inlet with adjustable fault tolerance window per inlet (AIR-Intelligence ADS-640).*
- *Supervised, low cost disposable filter cartridge. Average replacement period of three years in an office type environment.*
- *Filter loading compensation - maintains a consistent level of sensitivity ensuring optimum system performance.*

ClassiFire™
Perceptive Artificial Intelligence

AIR-Intelligence Series detectors continuously adapt their sensitivity to the environment in which they are installed, providing alarm thresholds which are 'relative' to the background smoke levels in the protected area, instead of placing the alarm threshold at a fixed level relative to ambient conditions. At any time, the detector's performance remains constant, regardless of fluctuations in the normal background smoke level, as can be seen in the Figure below. AIR-Intelligence bargraph displays only show smoke levels significantly above the expected background level, such as from a genuine fire situation.

Fig. 1 Relative Sensitivity - shows how the value S2 is "Relative" to the variable ambient value S1



The philosophy of Relative Sensitivity is to continuously calibrate the detector relative to the fluctuating background smoke level, so that the thresholds only take into account the increase in smoke caused by a fire. This means that as the background level changes, the threshold must change too.

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