



**Senator**

# Aspirated smoke detectors





# Aspirating air sampling technology

Aspirating smoke detection (ASD) 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 the presence of smoke.

Based on the forward light scatter principle, 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.



## Aspirating smoke detection

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 chamber is processed by a unique ClassiFire™ perceptive artificial intelligence algorithm which continually adjusts the detector sensitivity to maintain a consistent level of performance. The detector's waste-gate system samples a fraction of the air while bypassing the rest, thereby maximizing service life and permitting operation in diverse environments.

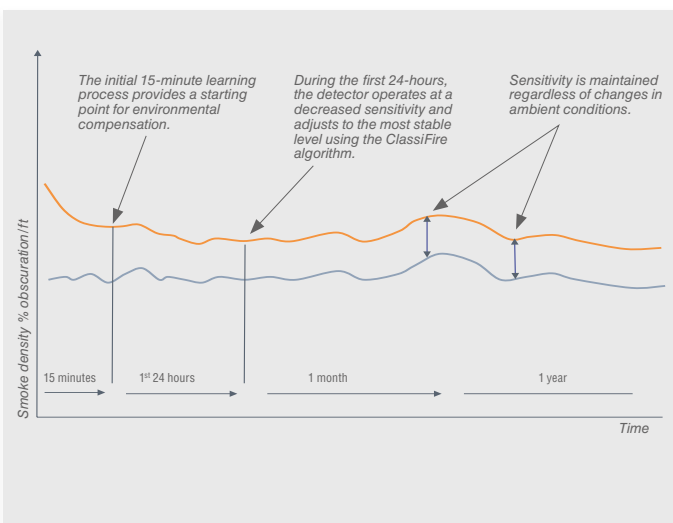


# Senator technology

Senator is a highly sophisticated high sensitivity aspirated smoke detection product that has been designed to ensure that installation and commissioning is as simple as possible, while optimizing performance. The Senator range of 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. The laser dust discrimination algorithm further enhances the performance of the range, ensuring a robust solution even in challenging dirty environments.

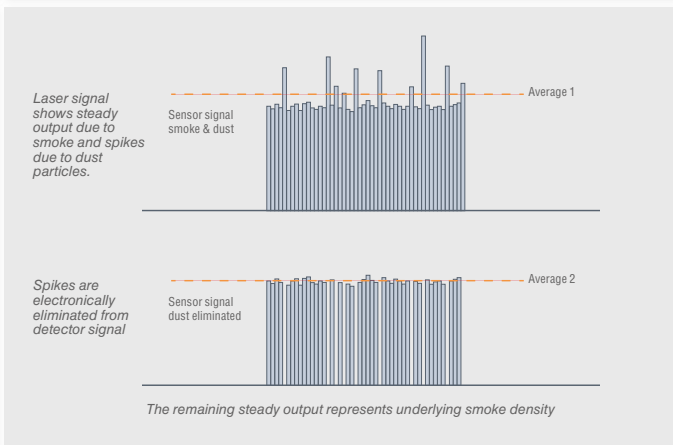
## ClassiFire

The Senator range of 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 on the right. The bar graph display on the detectors only show smoke levels significantly above the expected background level, such as from a genuine fire situation.



## Laser dust discrimination

Laser dust discrimination employs a sophisticated algorithm that identifies and eliminates spikes in the obscuration reading caused by particulate matter in the air sample. This makes it possible for the Senator range of detectors to reach higher levels of sensitivity without sacrificing reliability. The figure on the right shows how high peaks caused by the presence dust, are eliminated to ensure the real smoke density is clearly visible.



## Waste-gate technology

Waste-gate technology is a powerful feature of the Senator range, which dramatically extends the life of the particulate filters inside of the detectors. With this technique only a small part of the total air sample is passed through the particulate filter and then to the detector head. The rest of the air sample bypasses the filter and detector head and flows directly to the exhaust of the detector.

The presence of combustion products can be measured equally well from a small sample, as from a big sample. This feature ensures a longer service life for the the particulate filters, and in turn more capacity per maintenance cycle.



# Products

## Senator 25



- Single sampling pipe inlet
- Up to 750m<sup>2</sup> coverage
- Up to 50m pipe length
- Up to 10 sampling holes
- Four alarm thresholds
- SenseNET™ network ready
- Direct PC connect

The Senator 25 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 Senator 25 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.

## Senator 100



- Dual sampling pipe inlets
- Up to 1400m<sup>2</sup> coverage
- Up to 100m combined pipe length
- Up to 20 sampling holes
- Four alarm thresholds
- SenseNET™ network ready
- Direct PC connect

The Senator 100 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 Senator 100 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.

## Senator 200



- Four sampling pipe inlets
- Up to 2000m<sup>2</sup> coverage
- Up to 200m combined pipe length
- Up to 100 sampling holes
- Four alarm thresholds
- SenseNET™ network ready
- Direct PC connect

The Senator 200 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 Senator HSSD2 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.

## Senator ModuLaser



- Modular design
- Flexible installation options
- SenseNET™ network ready
- Direct PC connect via USB

Each detector module provides:

- One sampling pipe inlet
- Up to 2400 m<sup>2</sup> coverage
- Up to 250 m combined pipe length
- Up to 50 sampling holes
- Four alarm thresholds

The Senator ModuLaser provides high sensitivity smoke detection for medium to large applications, with localization of the sampling pipe containing smoke. ClassiFire™ Perceptive Artificial Intelligence ensures that each detector module operates at optimum sensitivity for the protected environment without the need for complex setup.

The modular design offers flexibility to install the detector modules in one location or distribute them, facilitating shorter sampling pipe and quicker response times. Each module provides 2 programmable inputs, and 3 programmable relay outputs.



## Command module



- Network management of up to 127 detectors
- Global network display
- Global network programmer
- Multiple configurations
- SenseNET™ RS-485 communications
- USB for PC interface

The Senator command module provides a single location display, control and interface for systems of up to 127 detectors. It provides global programming of all detector functions, at one conveniently installed location. All of this is made possible by the SenseNET™ network, supporting both bus and closed loop topology.

The onboard programmable relay outputs provide global detector output for integration to other systems. 2 programmable inputs are also available, allowing for inputs to the system. The unit is housed in the same form factor as the Senator display, providing a compact and modern design.

## SenseNET™ PC graphical system management



- Manages all devices centrally
- Manages 16 loops of 127 detectors
- Real-time indication of alarms, with sound
- User definable sound files
- Displays graphical maps with specific instructions
- Displays full system status or historical information

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 utmost 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 to 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.

## PipeCAD design software



- Import .dxf files
- Fire Dynamics Simulator support
- Transport time calculation
- Easy graphics interface
- Bill of materials creation

An integral part of each aspirated smoke detector installation, is the air sampling pipe network. This pipe network can be very simple with only one or two bends, or can be very complex with multiple bends and T's. The design layout is determined by the specific installation requirements, while still staying compliant to local fire regulations. PipeCAD™ is a Windows based program that provides a design environment where the air sampling pipe network can be designed and also modeled to check the performance. Once a final design has been reached, PipeCAD™ generates a bill of materials which can be used for ordering purposes.

## Sampling pipes



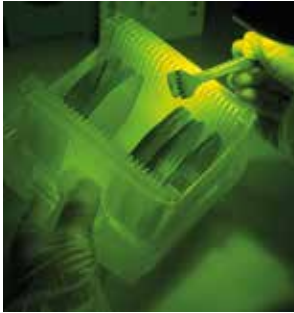
- Durable and robust
- Red – clearly distinguishable

A full range of air sampling pipes and accessories are available. Pipes are supplied in red, with printed warning text to identify them as the air sampling pipe network of the aspirated smoke detector. Various accessories are available, including remote sampling point assemblies, fittings and adaptors.



# Applications

## Very early warning



- Computer cabinet protection
- Computer room protection
- Communication facilities
- Clean rooms
- Datacenters
- Museums

High sensitivity smoke detection provided by laser based forward light scatter detection ensures reliable very early warning. This is key to ensure action can be taken even at the incipient stages of a fire, long before there are flames and this way keeping damages to an absolute minimum. Senator detectors are arguably the most sensitive of their type and can be thousands of times more sensitive than traditional spot-type detection systems.

When such a system is coupled with the ClassiFire™ Perceptive Artificial Intelligence system, it can provide and maintain optimum sensitivity without external input, maximizing sensitivity and minimizing nuisance alarms.

## High airflow environments



- Datacenters
- Communication facilities
- Clean rooms
- Dual 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. Senator detectors actively sample the environment and with their high sensitivity capabilities can overcome the dilution effect providing reliable very early warning in aggressively high airflow environments.

In these applications, the Senator 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 is 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 detector has no need to be located within the area it is protecting as the environment from the protected area is transported to the detector via an air sampling pipe network. This means Senator detectors can be used in areas of extreme temperatures or high humidity.

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



## Concealed detection



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

Where detection is required but 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 hole away from the main air sampling pipe run. Many configurations are possible. A wide variety of remote sample port accessories and remote sampling point assemblies are available.

## High ceilings



- Atriums
- Warehouse and distribution centres
- 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 poses a problem.

Senator aspirated smoke detectors 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, Senator detectors can also overcome the effects of dilution in large open spaces.

## Maintenance access issues



- Atriums
- Warehouse and distribution centres
- 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 local regulations. This requires access to ensure that maintenance personnel can carry out the testing and maintenance. Often this is impractical for traditional detection technologies, as access to equipment may be difficult due to its physical location high on a wall or ceiling, or access might be prohibited to the area where the equipment is located.

The air sampling pipe network of an aspirating smoke detector, transports the protected environment back to a strategically located detector, facilitating ease of maintenance, test and inspection.



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