ModuLaser - The ASD Solution

Hosted by
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EDWARDS LEARNING CENTER

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Topics

- ModuLaser Features and Benefits
- Aspirating Smoke Detection (ASD)
- Environmental Compensation
- ClassiFire
- Laser Dust Discrimination
- Product Range
- ModuLaser Components
- Backplane Architecture
- ModuLaser Cluster
- SenseNET and SenseNET+
- PipeCAD
- Remote

WHERE VERY EARLY WARNING IS REQUIRED

Paper Mills
Airport Terminals
Hospitals
Data Centers

WHERE HIGH AIR FLOW IS PRESENT

Aircraft Hangars
Engine Rooms
Food Preparation Areas

WHERE DETECTION IS TO BE CONCEALED

Museums
High-end Residential Buildings
Hotel Lobbies

WHERE SMOKE STRATIFICATION EXISTS

Atria
Ceiling Voids
Escalators

WHERE MAINTENANCE ACCESS IS IMPRACTICAL

Computer Cabinets or IT Data Centers
Cable Tunnels
Subway Tunnels

WHERE MISSION-CRITICAL DETECTION IS REQUIRED

BioMedical/Pharma Facilities
Distribution Centers
Record Storage Facilities

WHERE THE ENVIRONMENT IS EXTREME

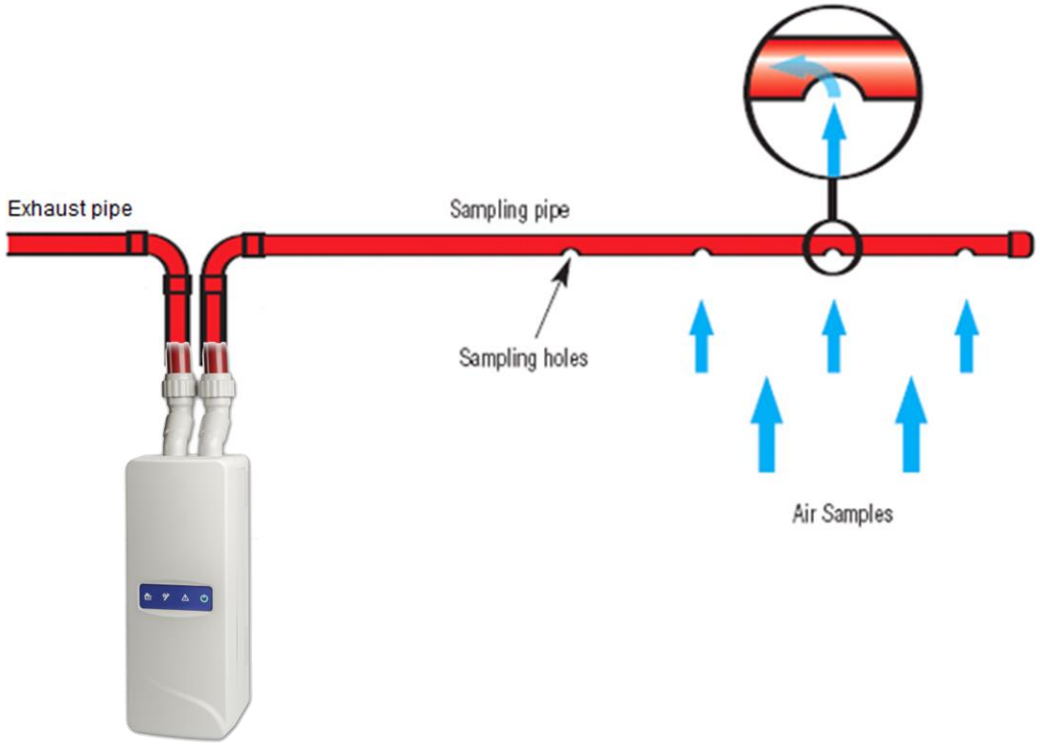
Cold Storage Facilities
Cleanrooms
Warehouses

ModuLaser System Overview

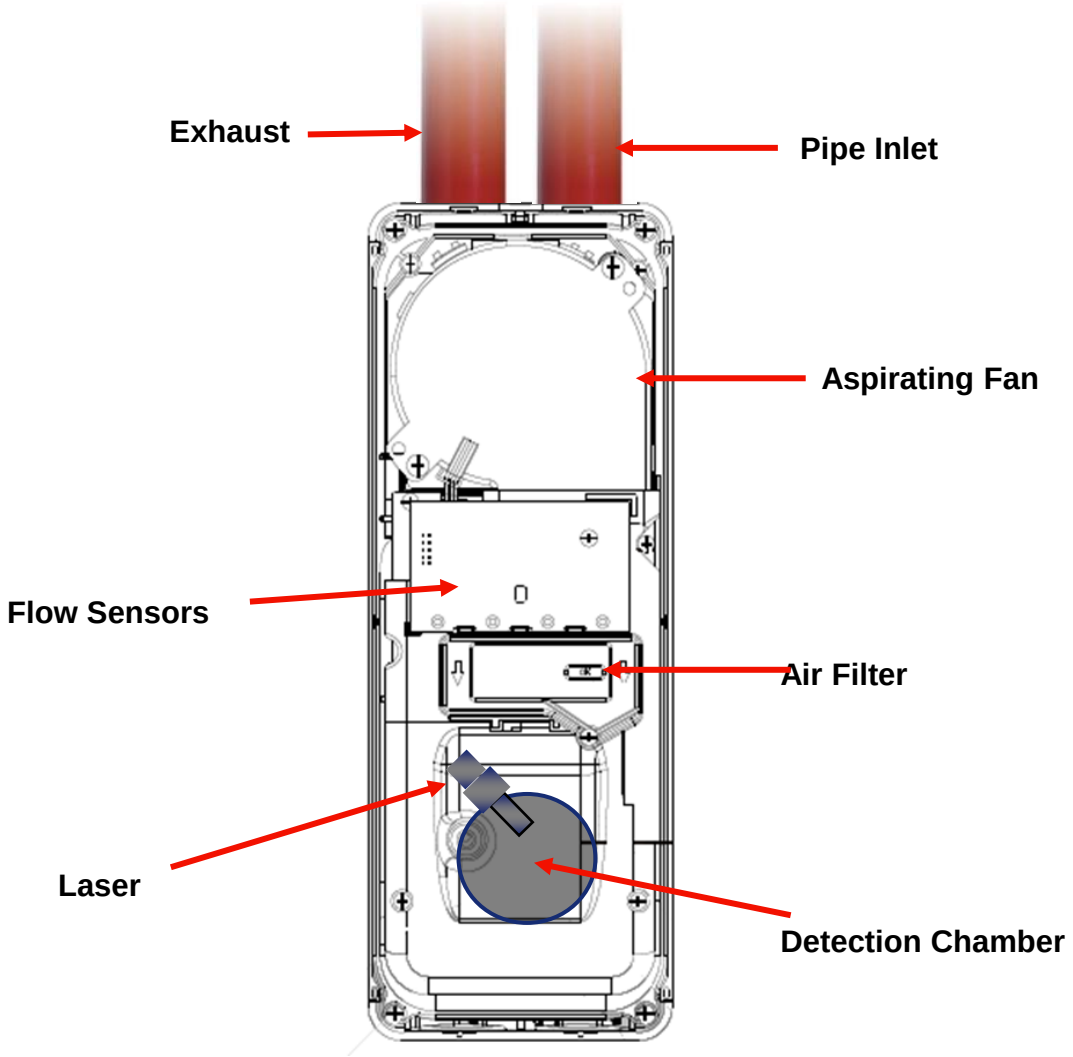
Features	Benefits
Multiple detector channels / zone	Cover a large area, while localizing the smoke
Programmable inputs + outputs	Flexibility to support interfacing to various fire systems
Quick fit pipe adaptors	Faster installation + easier maintenance
Pipe entry: top or bottom of detector	Shorter pipe runs + faster installation
Connectivity: USB	Latest technology for configuration
Intuitive user interface: color display + functional buttons	User friendly + easy navigation

What is Air Sampling Detection?

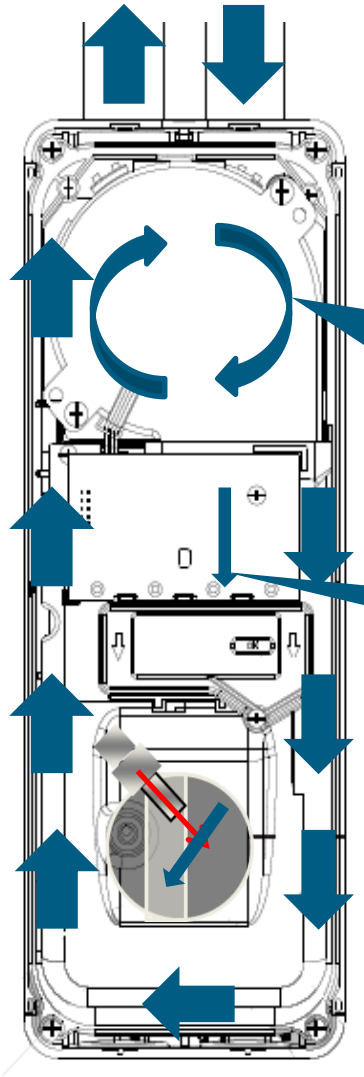
A method of smoke detection, where a sample of air is continuously drawn from the protected area through a network of sampling pipes and passed through a high sensitivity laser detection chamber



What is Air Sampling Detection?



Airflow



Air from the protected area is drawn along the Sampling Pipe by an efficient Aspirator

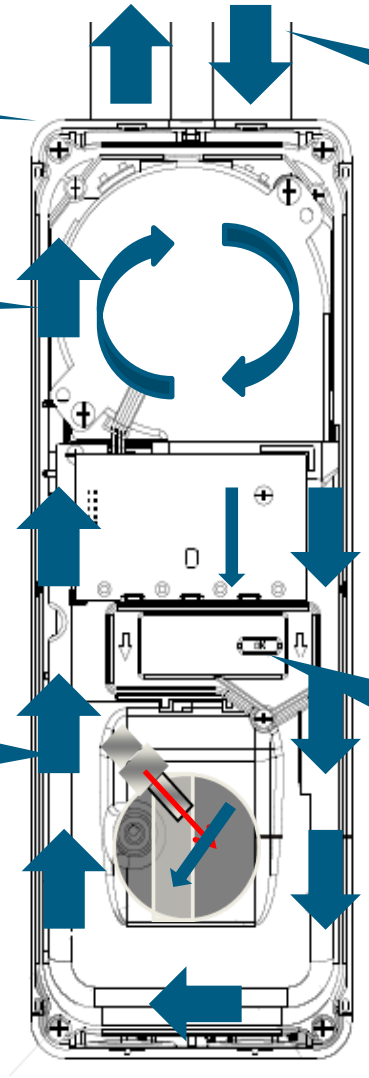
Passing over sensitive air-flow measuring sensor

Airflow

IP40 Rated

Air path is 100% sealed.

The remainder passes through a patented duct system called a *Wastegate*, and is exhausted out of the detector

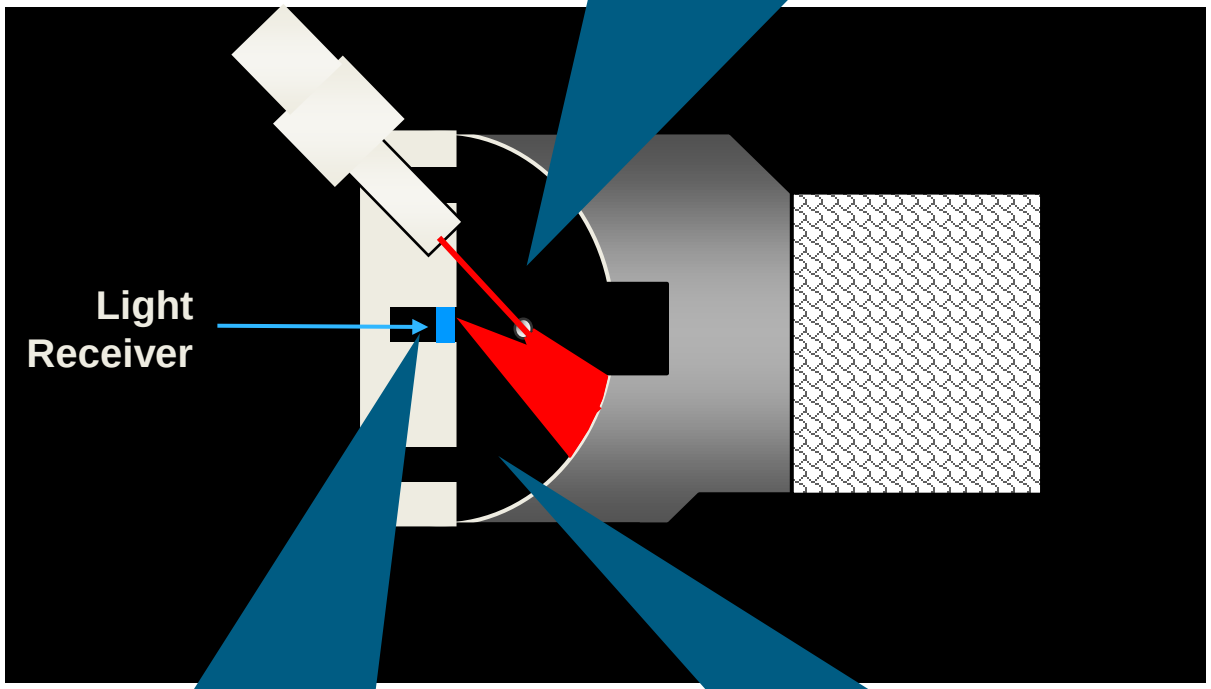


Of all the air which is drawn into the detector assembly…

Only a small portion (~10%) passes through the filter into the detection chamber

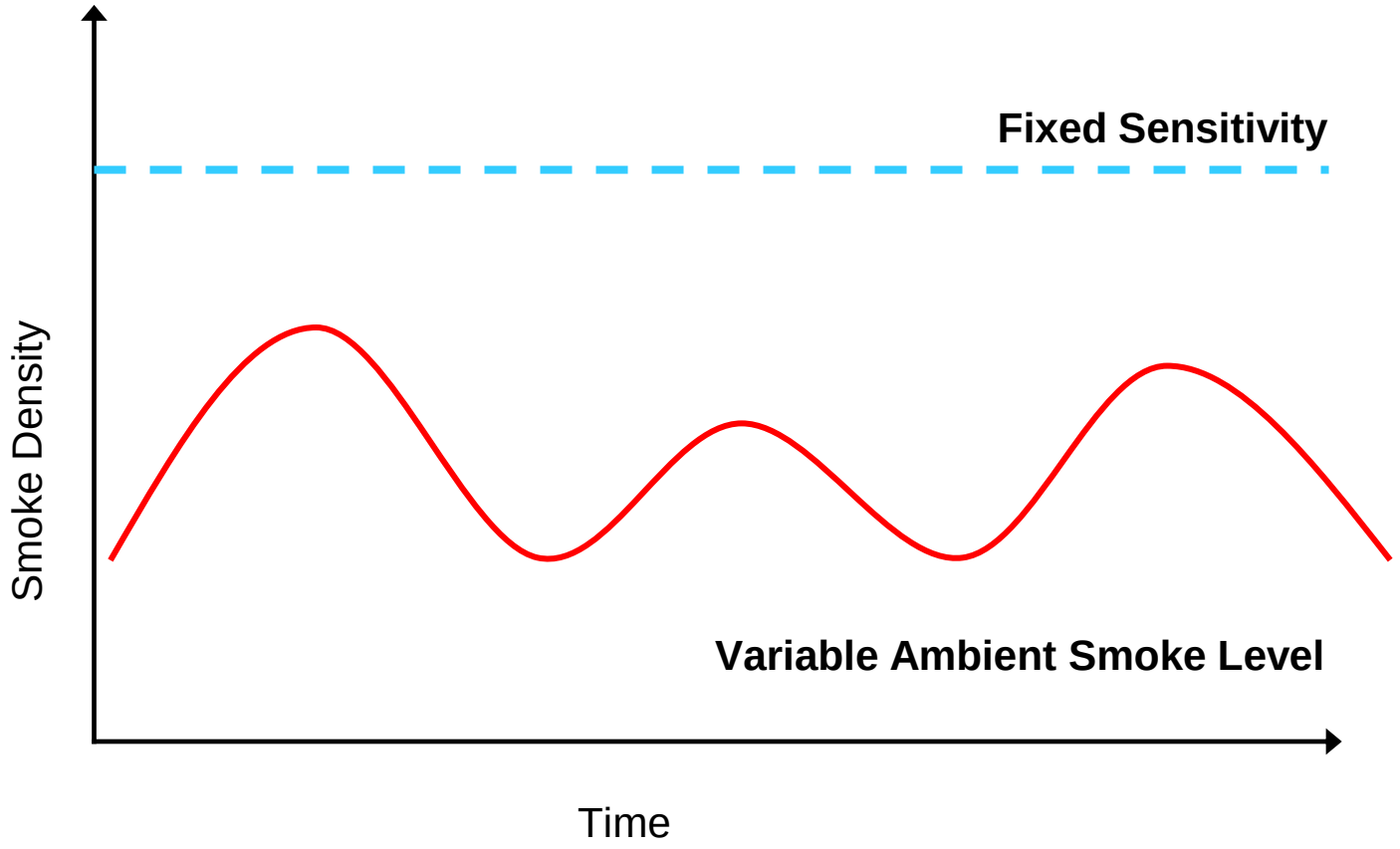
The *Wastegate* extends the life of the Separator and Detector considerably

Detection


Any Smoke particulate entering the chamber will be illuminated by the laser
Light Receiver
The quantity of light scattered increases with greater quantities of smoke particulate present
Light will be scattered onto the reflective plane, re-focussed onto the light receiver

Environmental Compensation

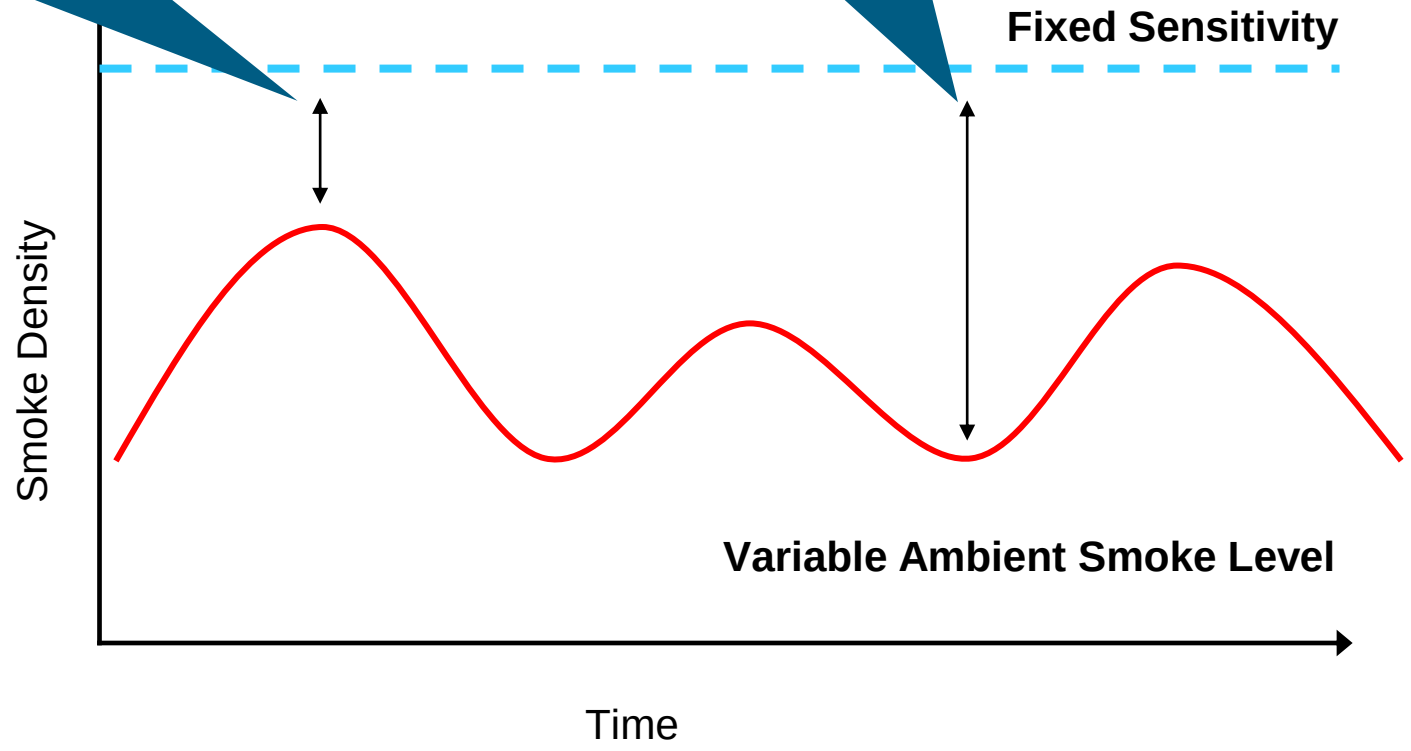
Sensitivity and Scaling



Sensitivity and Scaling

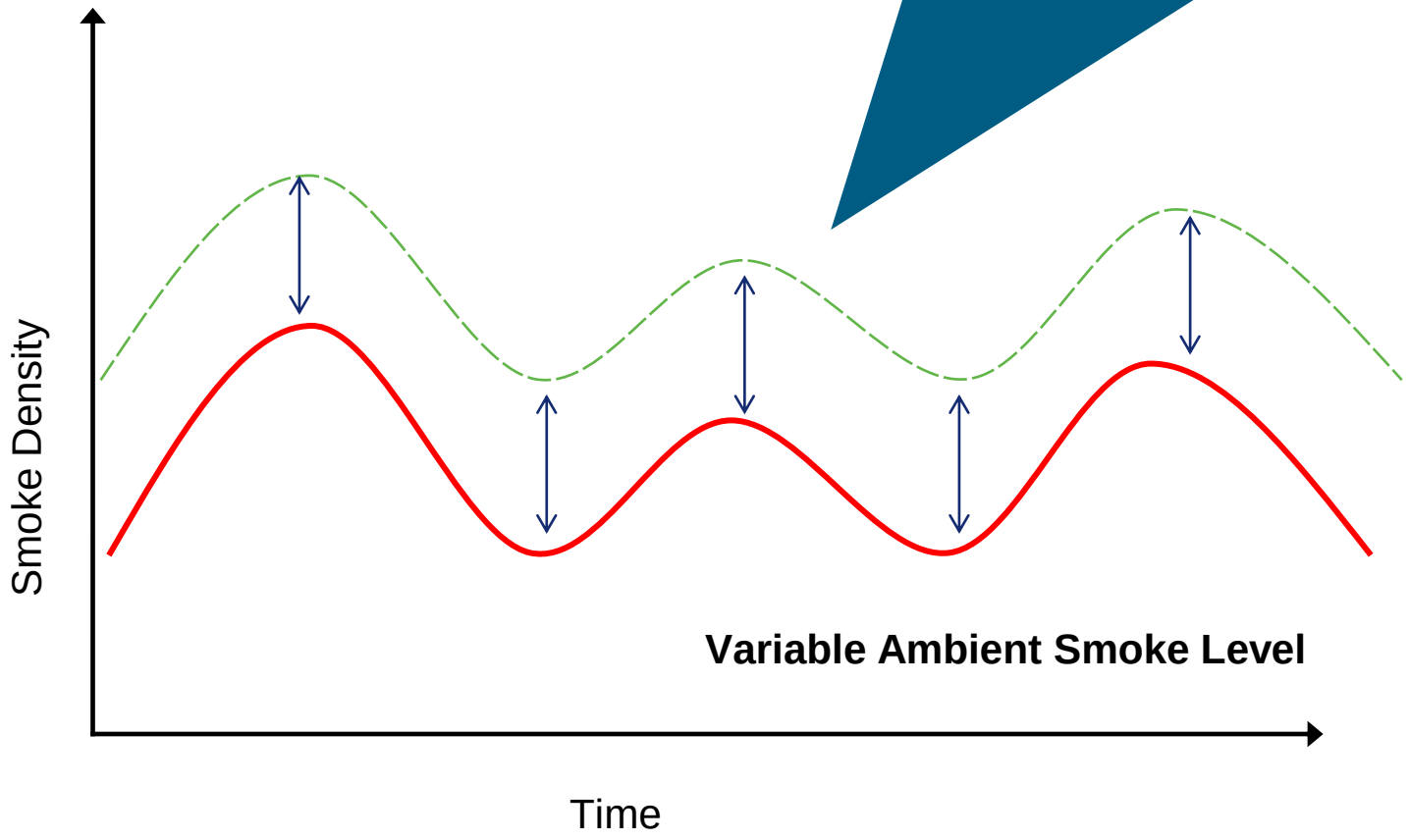
The Sensitivity Level must be set above the highest ambient level if false alarms are to be avoided

The Sensitivity to a Fire varies with changing ambient smoke levels



Sensitivity and Scaling

Because ModuLaser is a RELATIVELY scaled (sensitivity) detector, the sensitivity to a FIRE remains constant, regardless of changing ambient conditions



ClassiFire

ClassiFire

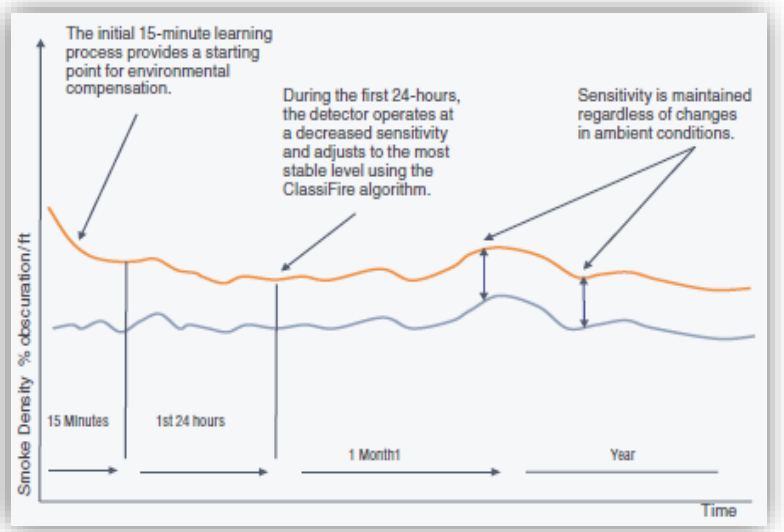
A patented “Perceptive Artificial Intelligence” process which ensures optimal detector performance

- During FastLearn the system quickly sets the alarm level to an initial low sensitivity
- The histogram generated by FastLearn is used as “seed data” for the standard histograms, which tailor the alarm setting to the operating environment during working and non-working hours
- Maximize protection during non-operating periods
- Minimize unwanted alarms during working hours
- Change of sensitivity can be remotely or automatically triggered
- Continually monitors its environment in order to fine-tune the alarm setting to optimum

Unique Features and Associated Benefits

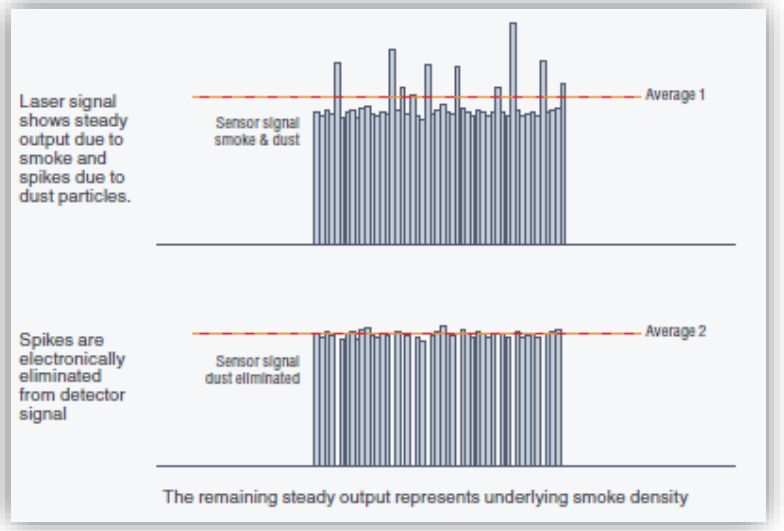
ClassiFire

- Sensitivity continuously adapts to environmental/background changes
- Alarm thresholds “relative” to protected area
- Detector’s performance remains constant in relation to background levels



Laser Dust Discrimination

- Algorithm identifies and eliminates spikes
- Achieve higher levels of sensitivity without sacrificing reliability
- Avoids false alarms due to the presence of dust



ModuLaser

North America

These products have been designed in accordance with:

- NFPA 72 National Fire Alarm and Signaling Code
- UL 268 Smoke Detectors for Fire Alarm Signaling Systems
- UL 864 Control Units for Fire Protective Signaling Systems
- FM 3230 Smoke Actuated Detectors for Automatic Fire Alarm Signaling
- FM 3010 Fire Alarm Signaling Systems
- CSFM California State Fire Marshal
- CAN/ULC-S529 Smoke Detectors for Fire Alarm Systems
- CAN/ULC-S524 Installation of Fire Alarm Systems
- ULC S527 Control Units for Fire Alarm Systems

Product Range Overview

UL 268 6th Edition Listed; FM Approved

UL-268 7th Edition, ULC-S529 4th Edition and ULC-S524

Description	1 pipe entry	2 pipe entry	4 pipe entry	1 to 8 pipe entries, with pipe location
Backplane	Yes	Yes	Yes	Yes
User interface	LED	LED	LED / LCD	LED / TFT
Modular Design	No	No	No	Yes
Connectivity	RS232	RS232	RS232 x 2	USB (X2)
RS-485 network	Yes	Yes	Yes	Yes
Maximum No. of sample points	10	20	100	50 Per detector
Pipe length	50 m / 164 ft.	100 m / 328 ft.	200 m / 656 ft.	250m / 820 ft.
Alarm Levels	4	4	4	4
Outputs	2 x Alarm + Fault	2 x Alarm + Fault	5 x Alarm + Fault	3 x Programmable per module

Detector Module

- Combined Pipework
  - Maximum 3 Tees
  - 1 straight run 320ft
  - 2 branches 300ft
  - 4 branches 150 ft. total max pipe 820ft
- Pipe entry from top or bottom with 180° rotatable detector module
- Four Alarm Levels (Alert, Action, Fire 1 and Fire 2)
- Sensitivity range: 0.00914 to 7.62% obs/ft.
- Adjustable fan Speed (1 to 16)
  - Fan fitted with a tachometer ensures variations in speed can be detected
- 2 programmable inputs
- 3 programmable outputs
  - General fault relays are failsafe
- Event Log 20000 events per module

Detector Module

Application	Hole sensitivity (% obs/ft)	Transport time(s)
UL 268 (7th Edition) Open Area Protection	1.70 to 2.18	6 to 43
UL 268 (7th Edition) Special Application	0.05 to 1.00	3 to 60
ULC-S529 4th Edition (Canada)	0.05 to 1.82	3 to 100
NFPA Very Early Warning System (VEWFD)	<1.00	<50
NFPA Early Warning System (EWFD)	<1.50	<80
NFPA Standard Fire Detection (SFD)	<2.50	<100

Sampling holes (per detector module)

- 20 x Class A holes VEWFD
- 40 x Class B holes EWFD
- 50 x Class C holes SFD

Display Module

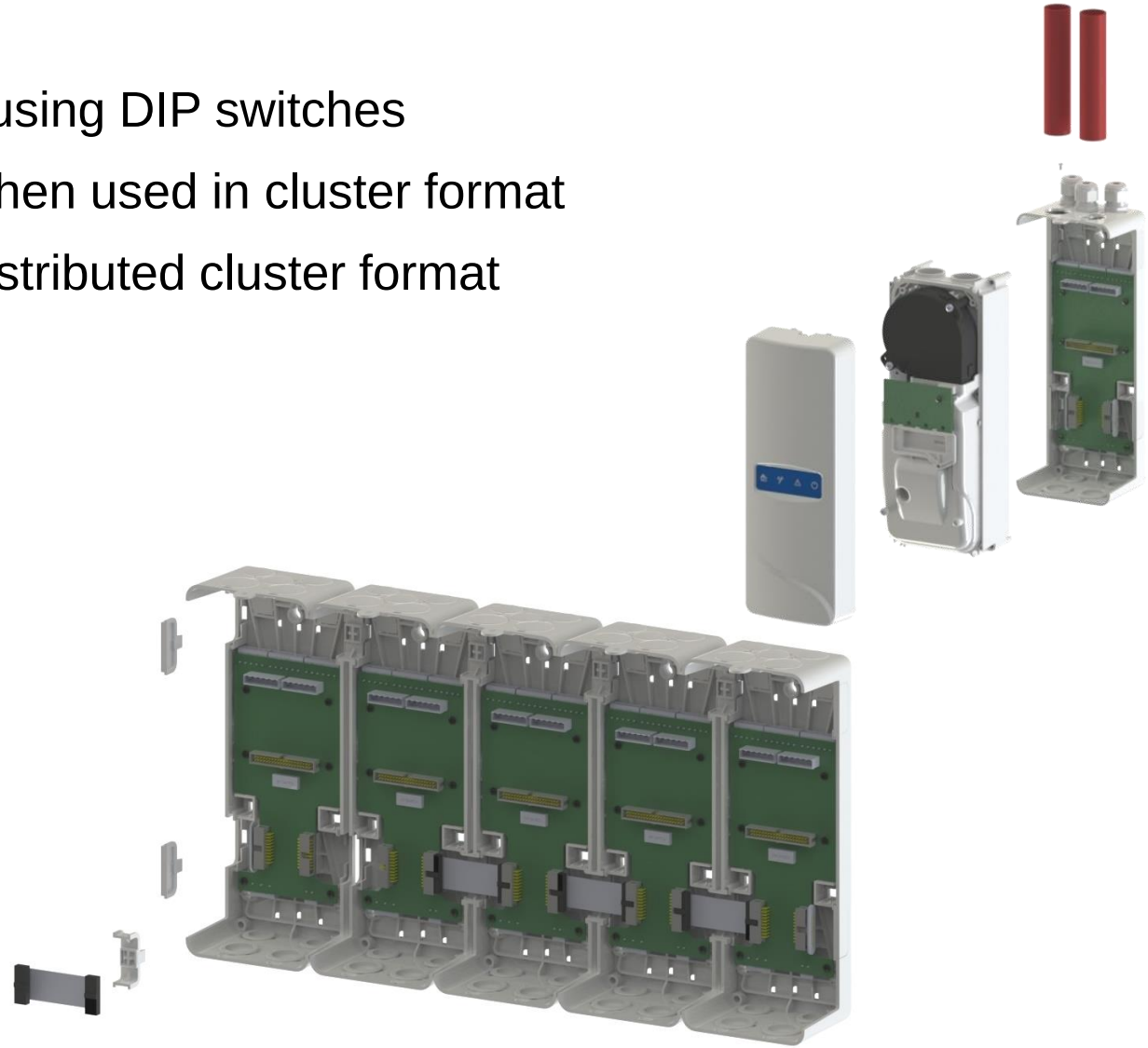
- Display Module with either full TFT full color display or LED only minimum display
- One display required
- One display can support up to 8 detector modules
  - Up to 4 detectors as a non-distributed cluster
  - Up to 8 detectors as a hybrid cluster
  - Up to 8 Detectors as a distributed cluster
- Functional buttons change depending on options selected in current screen
- 2 programmable inputs
- 3 programmable outputs
  - General fault relays are failsafe

Command Display Module

- A single location display, control, and interface option for a network of detectors
- Maximum of two per SenseNET
- RS-485 communication SenseNET
- ModuLaser and product range networked components
- Supports up to 127 modules including ModuLaser displays and detectors
- 2 max per SensNET
- Occupies 1 address

Architecture Backplane

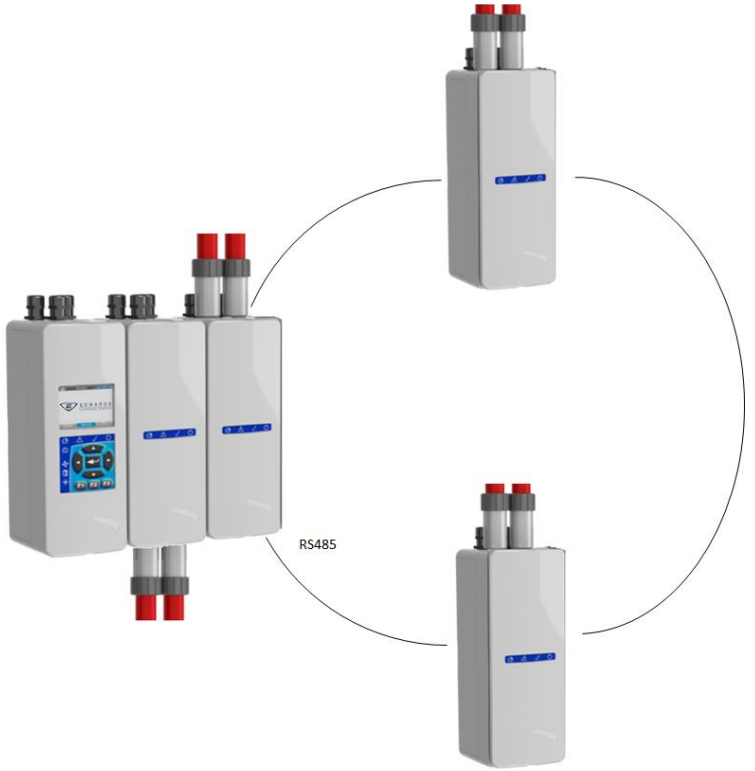
- Same backplane used for all modules
- SenseNET address is set in the backplane using DIP switches
- Inter-connection (mechanical + electrical) when used in cluster format
- Inter-connection (electrical) when used in distributed cluster format



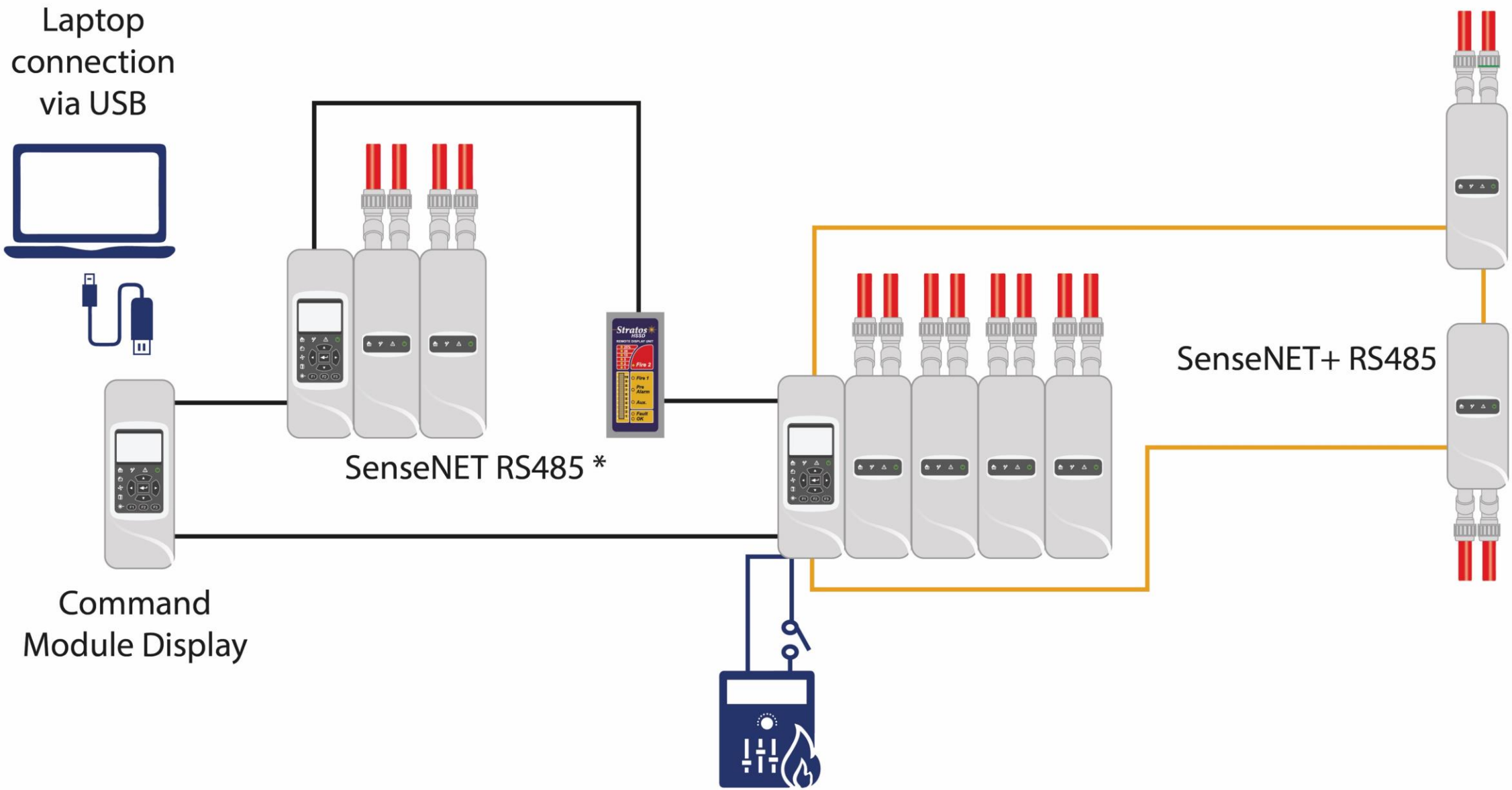
What is a ModuLaser Cluster?

Combination of a display module and multiple detector modules

Non-distributed cluster
Maximum 4 detectors

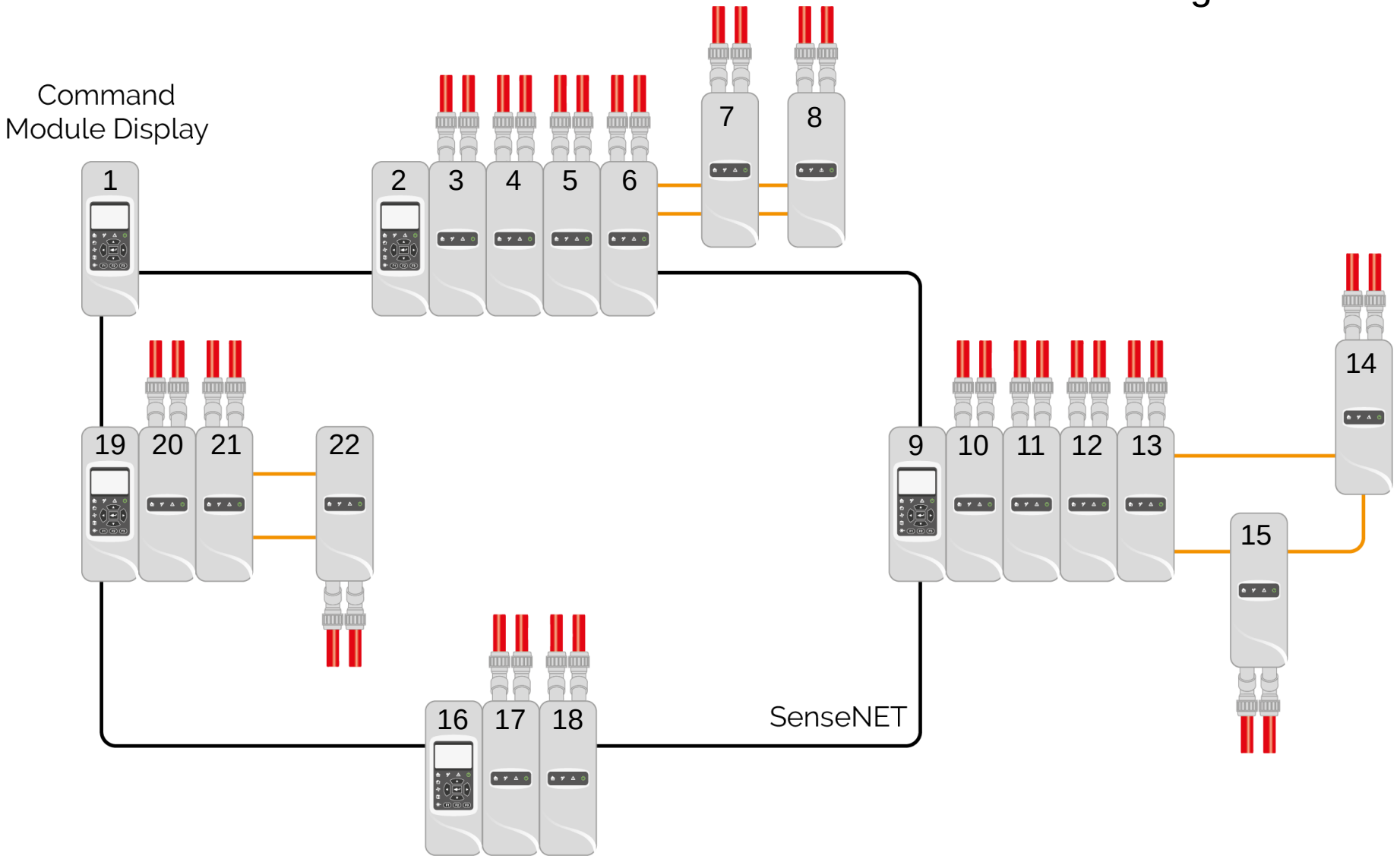


Distributed cluster
Maximum 8 detectors



* Only supported on Command Display Module

Address range from 1-127



PipeCAD

Design codes

NFPA 72 (2022) Reference Points:

17.7.4.6	Air Sampling–Type Smoke Detector
17.7.4.6.2.2	Sampling pipe networks shall be designed on the basis of, and shall be supported by, computer-based fluid dynamics design calculations to ensure required performance.
17.7.4.6.2.3	The sampling pipe network design calculations shall include pressure, volumetric flow, and alarm sensitivity at each sampling port.
17.7.4.6.2.4	Software applications for the design of pipe networks shall be listed for use with the manufacturer’s equipment.

Hardware

Components

Each module comes with its own backplane, connecting hardware grommets, and screws

FHSD8300-ULF
9-30780-KID-ULF
ModuLaser
Minimum display module

FHSD8310-ULF
9-30781-KID-ULF
ModuLaser
Standard display module

9-30699N-P
9-30699N-P
Replacement filter
ModuLaser – 6 pack

FHSD8330-ULF
9-307833-KID-ULF
ModuLaser
Detector module (pipe adaptors included)

FHSD8320-ULF
9-30782-KID-ULF
ModuLaser
Command display module

RedPipe Kit

RedPipe Kit RP5240 includes:

- 96’ of RedPipe
- 90 Degree Elbows (3)
- Couplings (8)
- Tee (1)
- Endcaps (2)
- Pipe Clip Hangers (32)

¾” 90˚ Elbow
RP5202X

¾″ Endcap
RP5205X

RedPipe
RP5209

Pipe Clip Hanger
RP5212

¾″ Coupling
RP5206X

¾″ Tee
RP5204X

RedPipe Fittings

¾” 90˚ Radius Bend
RP5215X

¾” 90˚ Elbow
RP5202X

¾” 45˚ Elbow
RP5203X

Union
RP5208

¾″ Coupling
RP5206X

Pipe to Pipe Adaptor
RP5207

¾″ Tee
RP5204X

¾″ Endcap
RP5205X

Pipe Accessories

Quick Release Airline Valve
9-10976

¾” Large Check Valve
9-10978

¾” Large 2-Way Ball Valve
9-10980

Closed Pipe Clip with Stand Off
25 pack
9-10936-25

Capillary Sampling

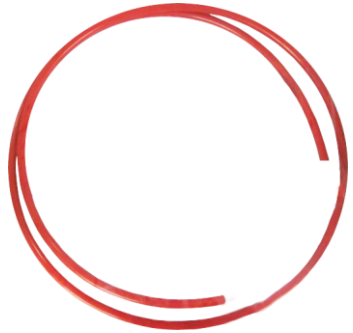
Where to use Capillary Sampling?

- Below false ceiling
- In-cabinet detection
- Aesthetics, security, or unobtrusive protection

RP5216

RP5222

Air Sample Points



½″ Capillary Tubing
RP5227

One set of capillary sampling fittings includes:

- In-Line Sampling Point Adaptor, Tubing, and Sampling Point
  - Ordering capillaries differs for applications

½″ Quick Disconnect Tubing
RP5225

Test Point
RP2226

All Sample Points must be labeled

Installation

Installation overview

To install the ModuLaser system, follow these steps:

1. Fix the backplane to the wall
2. Connect all field wiring to the backplane
3. Set Address using the DIP switches
4. Place the display or detector module (without the cover) onto the backplane
5. Install piping
6. Place the front cover onto the display or detector module

Pre-installation

- Review the following documents prior to installation:
  1. ModuLaser Installation Manual
  2. PipeCAD software:
     - Pipe Schedule
     - Drill Schedule
     - Results
     - Bill of Materials
- Prepare pipe and pipe fittings
- Obtain tools and permissions

Pipe cutter

- Use pipe cutting shears or wheel type plastic tube cutter
- Do not use a saw
- Remove all dust and shavings created when cutting the pipe
- Vacuum piping before connecting to ModuLaser detector

Remote Software

Remote

- Configure device and communications settings (in online or offline modes)
- Enable or disable devices on the network
- Perform a global device reset
- Scan a network and view network status information
- View system events, chart records, and ClassiFire histograms

Note: Configuration of detectors and display can be configured from front panel controls.

Maintenance

Maintenance

Minimum recommendations - always consult local codes and standards

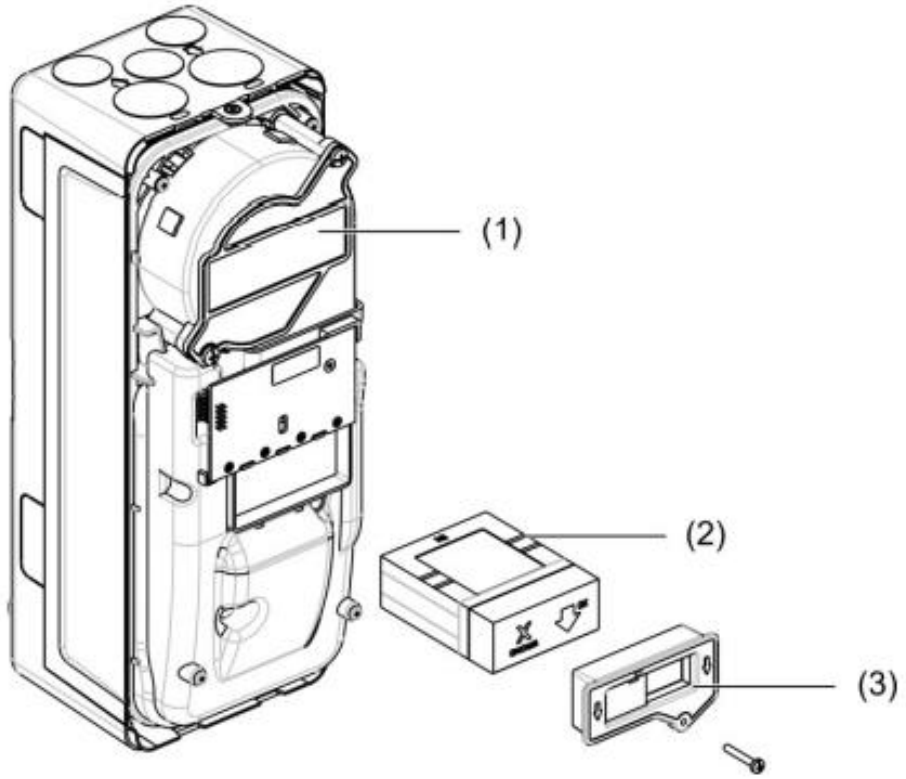
Maintenance Check	Monthly	Bi-Annually	Annually	Every Two Years
Power Supply	X			
Pipe Network (visual)		X		
In-Duct Pipe Test		X		
Filter Inspection		X		
Raw Air Flow		X		
Pipe Integrity Smoke Test			X	
Check Pipe Flow			X	
Cleaning Sampling Points				X
Flushing Pipe Network				X

More often for challenging environments

Filter fault

- The detector indicates a Filter fault (on the detector status screen) when the filter value reaches 20%
- The detector should be powered on when replacing the dust filter to ensure the filter status is reset

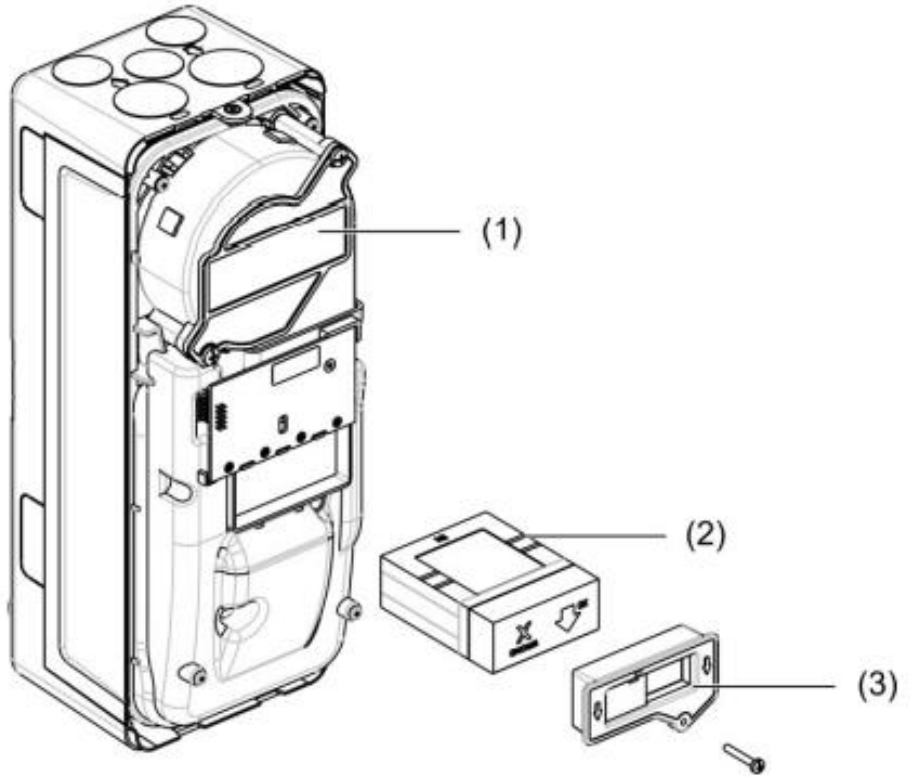
Health hazard warning: The dust in the dust filter exposes maintenance personnel to health hazards. Use caution.



1. Detector
2. Dust filter
3. Plastic cover

Replace filter cartridge

- Remove the detector cover
- Remove the screw securing the dust filter, and remove the assembly
- Remove the plastic cover from the filter cartridge and dispose of the cartridge
- Fit the new cartridge into the plastic cover with IN facing towards the top of the detector (as shown)
- Slide the entire assembly into the detector
- Secure the filter assembly using a screw

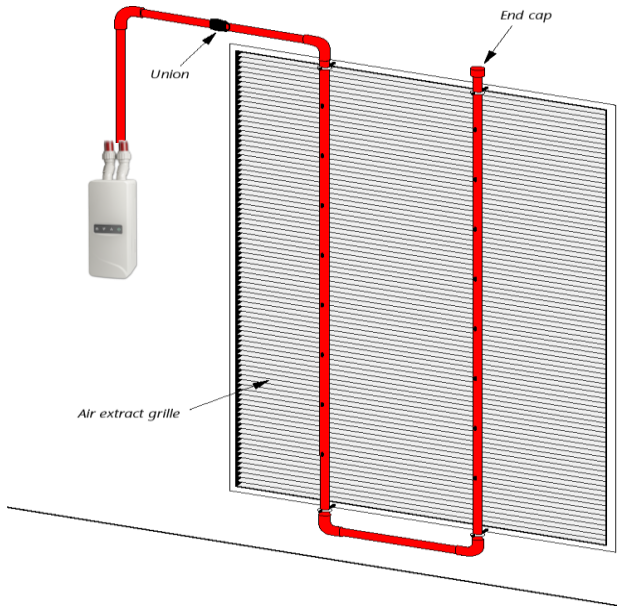


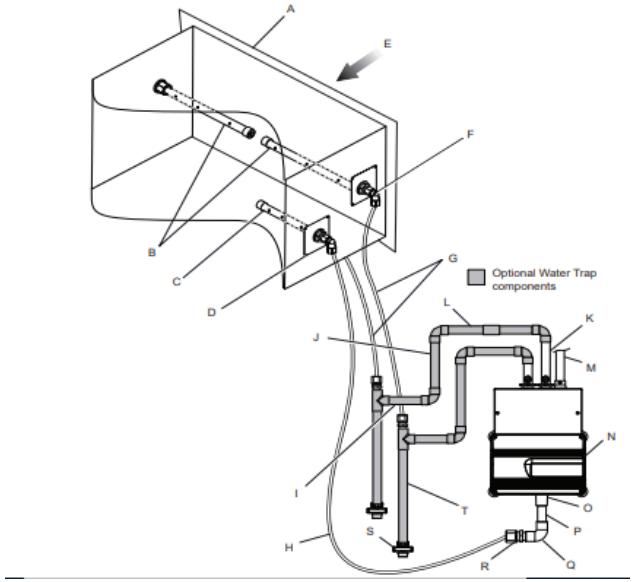
1. Detector
2. Dust filter
3. Plastic cover

Applications

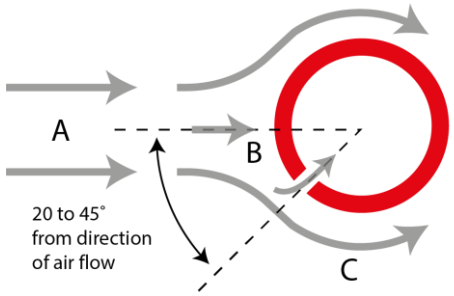
Duct Detection / Air Grill Applications

- Full air intake grille should be adequately covered by number of sampling points
- Each sample point approximately every 6”
- Single pipe should not cover multiple AHUs
- Large airflows may require stand-off brackets
- Pipe should be positioned with sample holes at a 20-45° angle from the incoming airstream
- ASD needs to be UL listed for duct detector applications
- Ensure appropriate drip lines for potential condensation



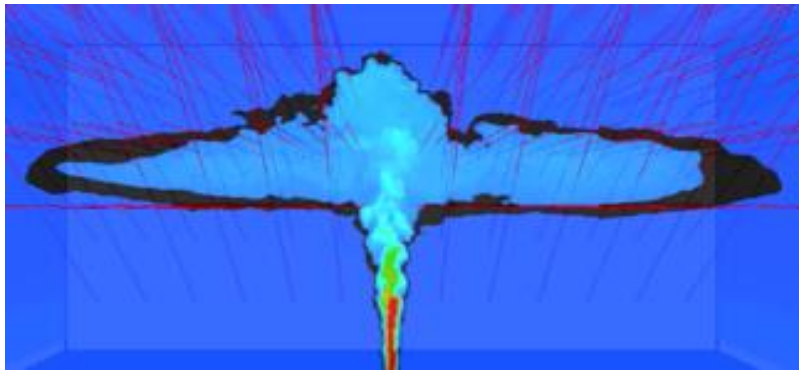


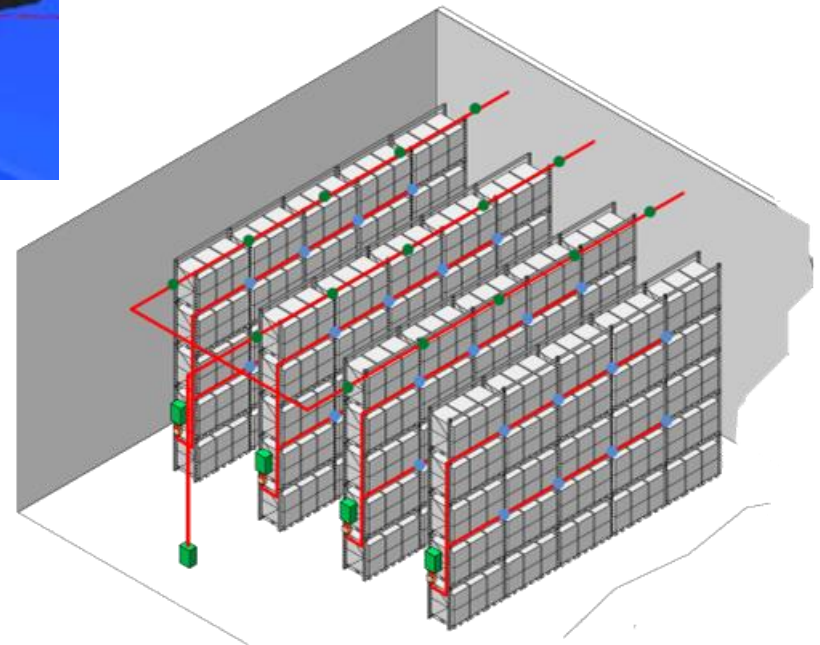
Port orientation



Large Open Area Applications

- FM having more say in large distribution centers
- Better and earlier detection for densely filled fulfillment centers
- ASD improves evacuation time requirements
- ASD is better application where smoke stratification can occur and there are many line of site obstructions
- ASD is much easier to test, service, and maintain
- Stratification and service access apply to atriums as well





Dirty Environments

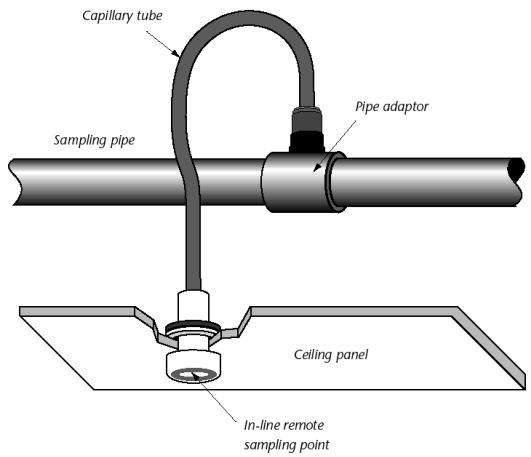
- Discrimination needed between dust, vapors, and smoke
- Environmental compensation for varying air conditions
- By-Pass or Wastegate technology to improve filter life
- May need to install external filters in piping before detector
- Install isolation ball valves at the detector on the aspirating system piping runs
  - Include a port so that compressed air can be used to blow back through piping to clean out dirt

Cold Storage

- Detectors located outside the environment
- Typically, early warning or standard detection requirements
- Special piping requirements to bring sampling air temperature up to a level that won’t damage the detectors

Concealed Detection

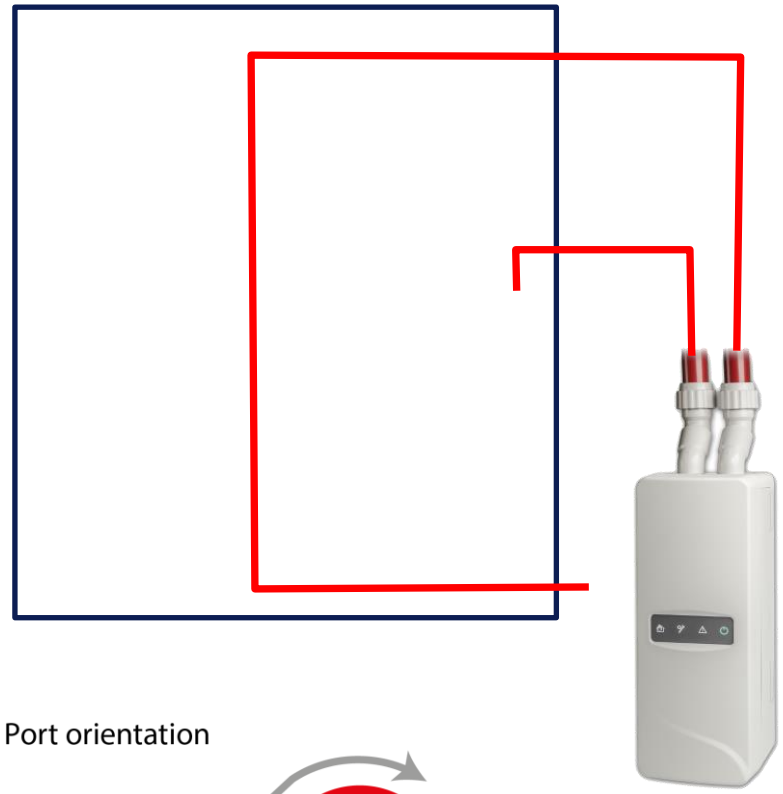
- Museums/Churches/Jails
- Typically, standard detection requirements
- Capillary tubing runs to main piping trunk
- Reduced risk of tampering of smoke detectors

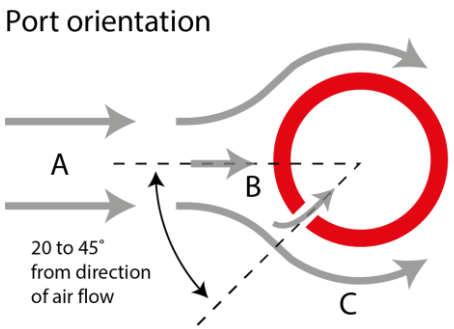


Elevator Shaft Application

Advanced elevator system actions for movement of people during an incident requiring smoke detection

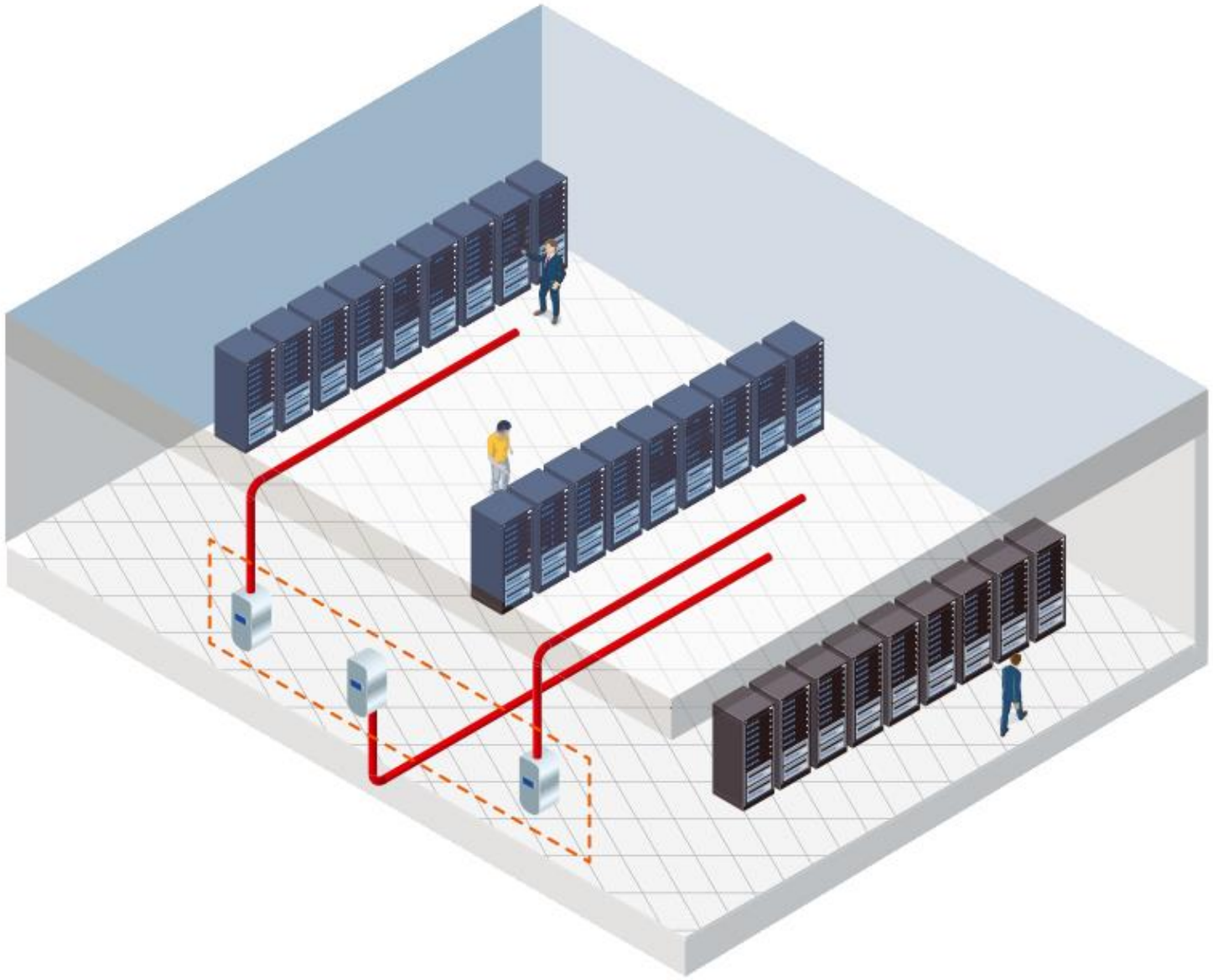
- ASD for easy access for testing and maintenance
- ASD to accommodate the varying air flows due to elevator travel (piston effect)
- ASD accommodates higher level of contaminants in the shaft air
- Different requirements for up to 4 floors and above 4 floors
- Sampling port orientation 30 degrees away from shaft effect airflow
- May consider delay of airflow alarms (site specific determination)





Data Centers

- Distributed Aspirating Architecture
- Plan for UL268 7th Edition now versus later
  - Piping designs will be impacted
- Transport time is NOT the only factor
  - Review balance of piping design to reduce potential of nuisance alarms due to changes in flow and differential pressure
- Don’t mix Hot Aisle and Cold Aisle detection in the same detector
- Have ASD system connected to critical power to reduce run-time requirements of ASD on batteries



ModuLaser Training

Edwards/Kidde Certification Training

- Blended Course:
  - eLearning prerequisite
  - Instructor-Led one day virtual classroom

EDWARDS
LEARNING CENTER

Resources

Edwards
ModuLaser

Kidde
ModuLaser