AVA PREVENT
Aspirating Cabinet Smoke Detection

Company Introduction

April_2023

AVA PREVENT & SALES OFFICE

- Established in Taiwan for more than 10 years, AVA Prevent is a manufacturer of Aspirating Smoke Detectors with headquarters in New Taipei City, representation offices in Taichung, Kaohsiung, and a branch offices in Shanghai, China.
- Our experienced team is not only responsible for the R&D and manufacture of our own products, but also provides technical support on the installation, commissioning and maintenance for our clients, in Taiwan.
- In regard to the international market, not only we guarantee our services through our main distributors situated across the world, as we provide, additionally, OEM and ODM services.
- The quality of our products is tested certified under the FM Approval in U.S., CCCF in China, and KFI in Korea.

Taipei Main Office

Shanghai Branch Office

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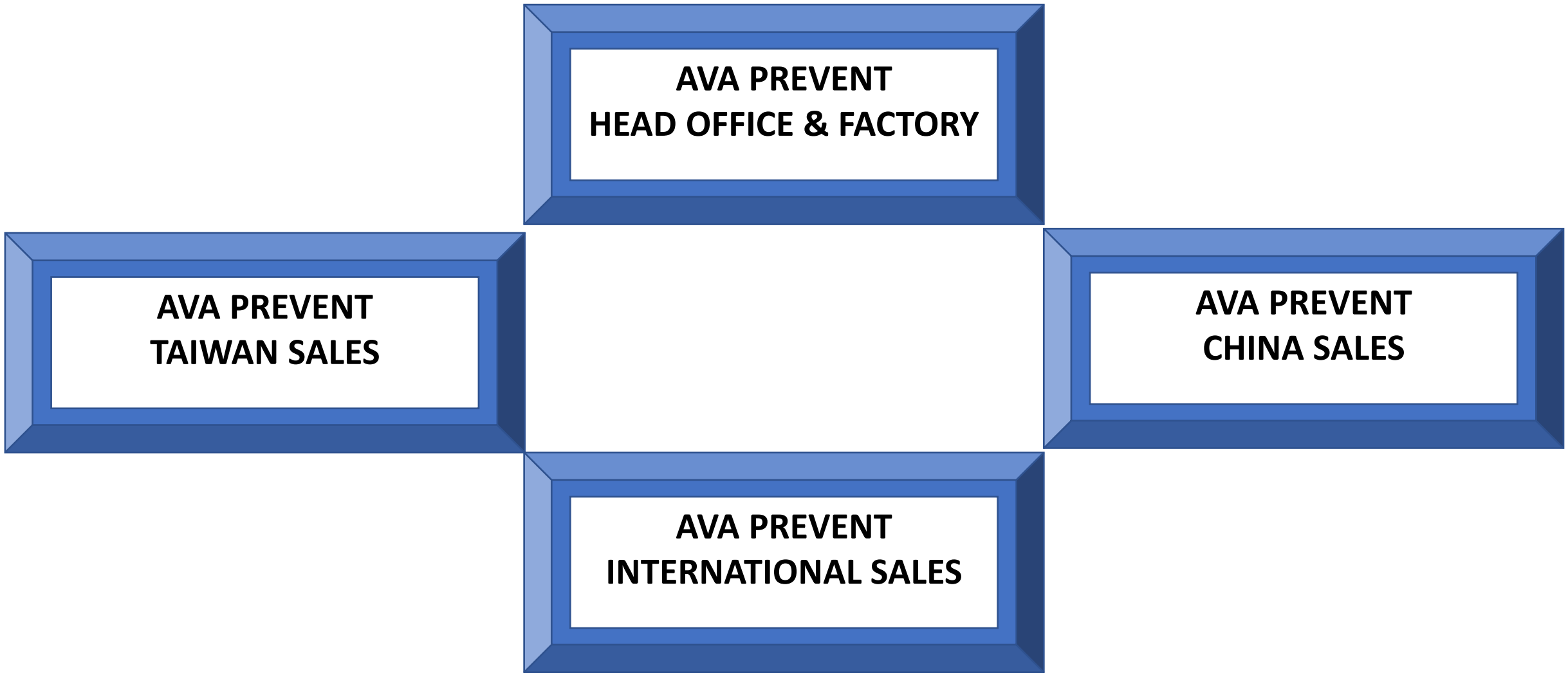

AVA PREVENT
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AVA PREVENT DEVELOPMENT ROAD MAP

Main Stream Aspirating Smoke Detector Series

- Quartas-500s - 1 pipe model
- Quartas-2000s (1A) - 4 pipes model)
- Quartas-2000s (4A) - 4 pipes scanning model

Cabinet Aspirating Smoke Detector Series

- CSD-100

FM APPROVED

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AVA ASD Model – Current Generation

- Quartas-500s
- Quartas-2000s
- Fanfare-2000
- CSD-100

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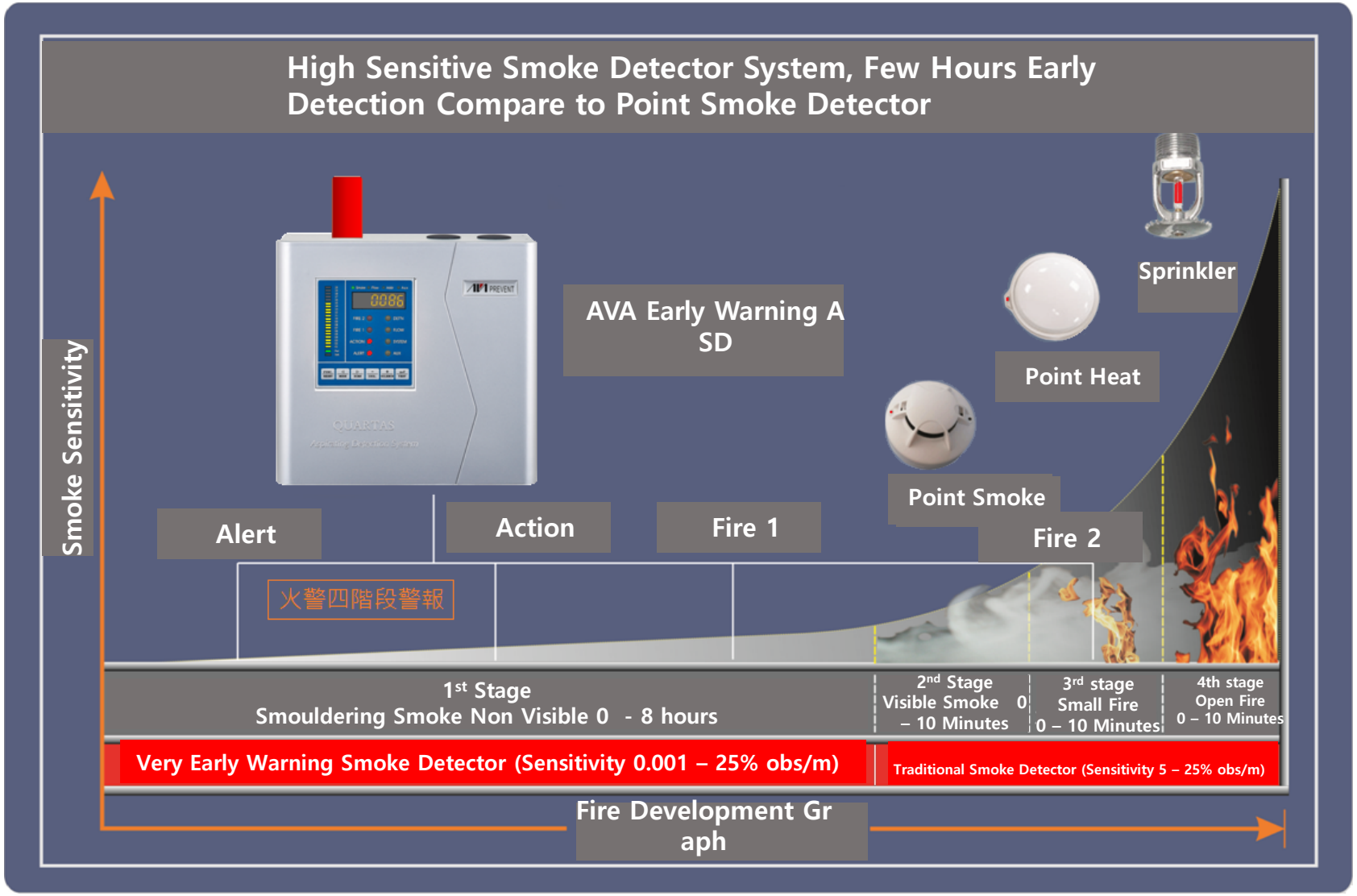
FIRE DEVELOPMENT GRAPH



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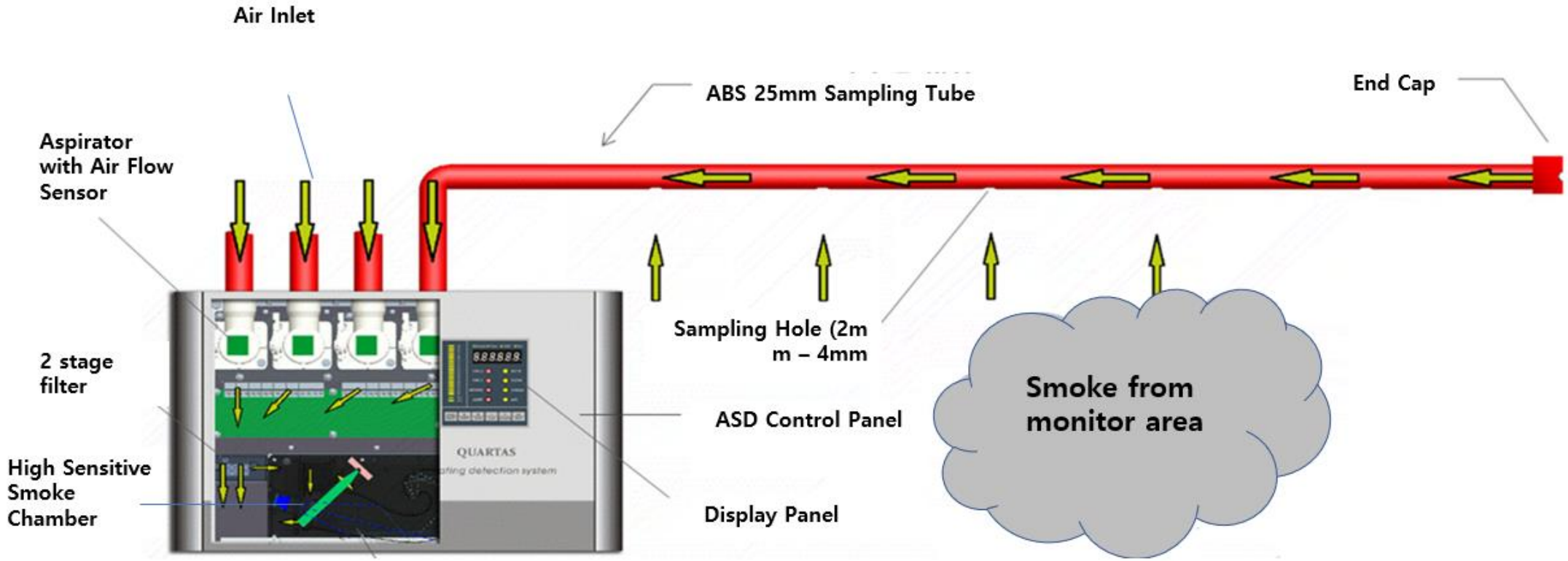
AVA ASD Operating Principle



- ASD System is an ***ACTIVE*** Smoke Detection System
- ASD System consist of High Sensitive Smoke Detector (Detection Range from 0.001% obsc/m-20%) High Efficient Aspirator (Adjustable Speed), and Sampling Tube Network to drawn the air for evaluation
- ASD Detection Unit shall ***MINIMUM*** consists of High Sensitive Smoke Detector, High efficient Aspirator, Front Display with LED to display Sample Area smoke condition, Relay Output to report abnormal situation to alert user, Monitor Filter.

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Main Application for ASD / CSD

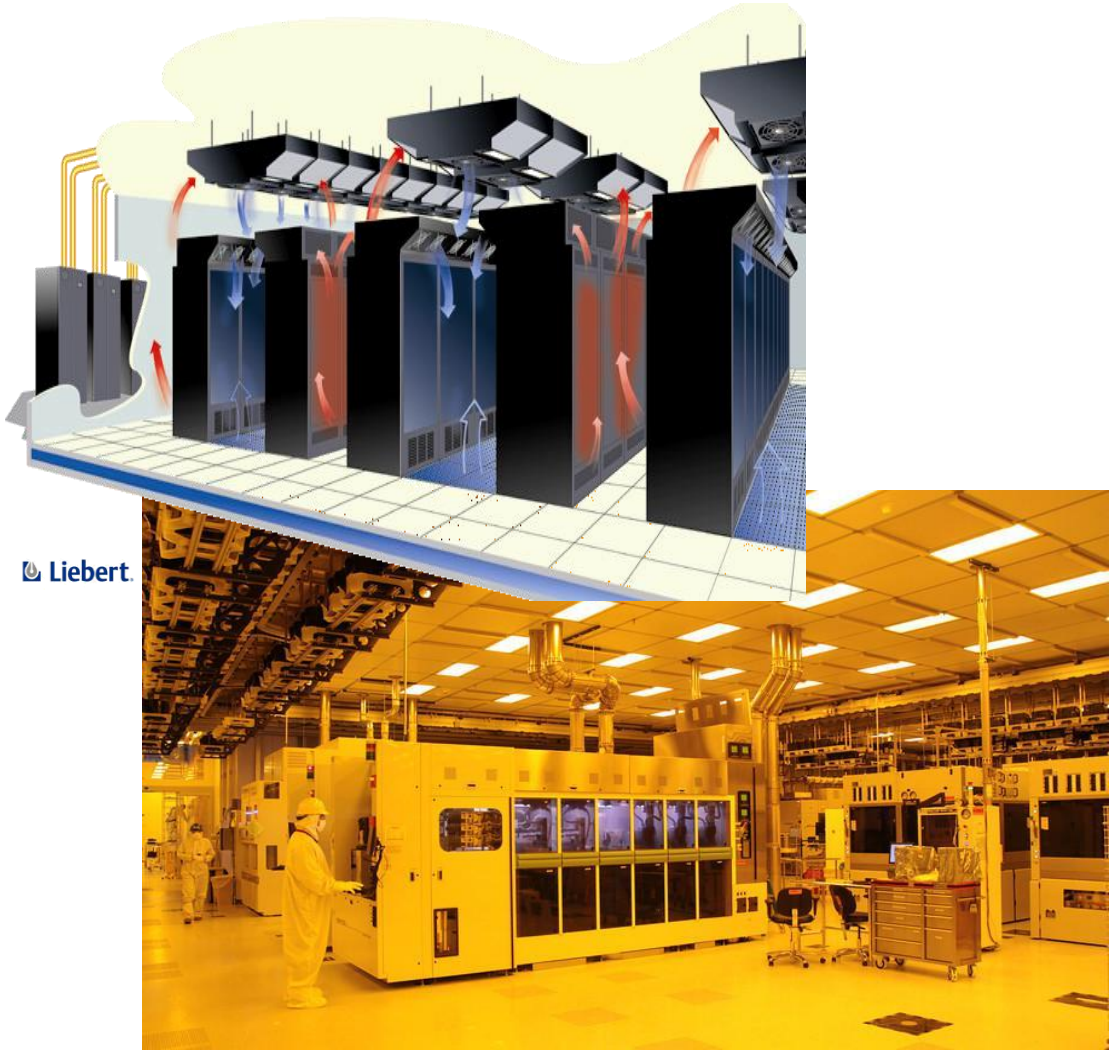
- CLEAN ROOM
- TELECOMMUNICATION
- WAREHOUSE / HIGH BAY RACK
- INDUSTRIAL PLANTS
- HERITAGE BUILDING
- RECYLING PLANT
- DUCT DETECTION
- EDP – Server Room / MIS Room
- DATA CENTER (Internet, Cloud)
- AIRPORT
- POWER CABINET / HIGH VOLTAGE
- BIG HALL / FACTORY / HIGH CEILING
- COLD STORAGE / DEEP FREEZER
- ELEVATOR SHAFT / PRISON CELL

REASON USING ASD

EARLY DETECTION REQUIRED

- Wide Detection Range from 0.001 – 20% obsc/m

- Field Adjustable Alarm Threshold
- 4 Level of Alarm Associate with Outputs for
  - Alert ➔ To Verify Protection Area
  - Action ➔ To Initiate Early Action
  - Fire 1 ➔ To Perform Emergency Action
  - Fire 2 ➔ To Initiate Fire Suppression with double-knock



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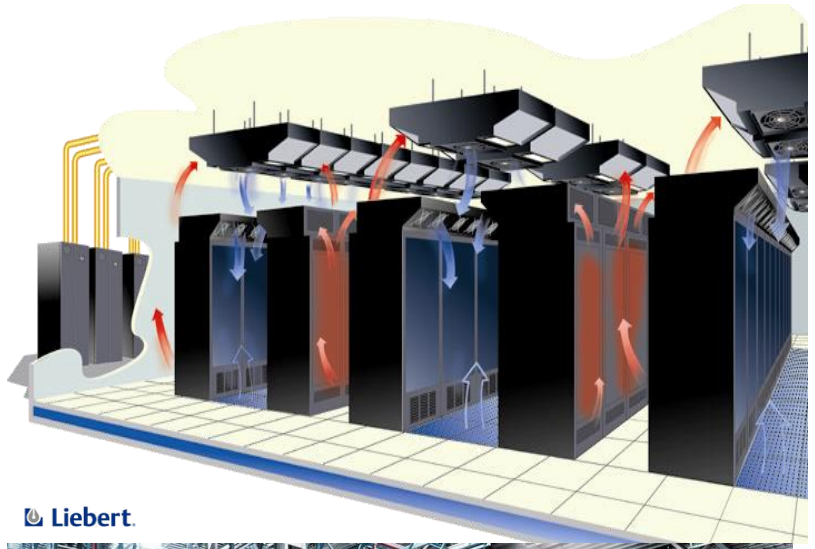
REASON USING ASD

SMOKE DILUTION / STRATISFICATION

- Smoke will be diluted by
  - High Air Flow area
  - Large volume and high ceiling
  - Airport

- High air flow will caused problem to the point smoke detector install at the ceiling.

- Correct detection method shall be design
  - Primary Sampling Method
  - Multi-Stage Sampling Method for High Ceiling / warehouse

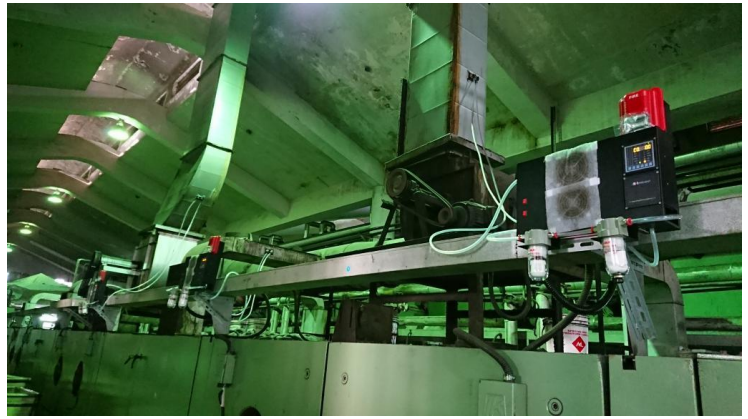


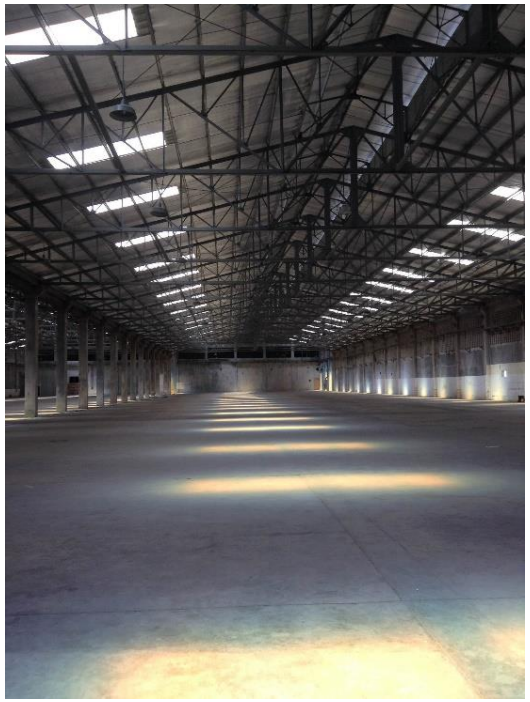
REASON USING ASD

MAINTENANCE CHALLENGES

- Area with access challenges
  - High and Big Hall
  - Warehouse with high storage rack
  - Above Ceiling and False Ceiling
  - Production Area
  - Inside Duct
  - Above Switching Cabinet
  - High Voltage Room
  - Elevator Shaft

- Maintenance can be perform at the ASD Unit itself.





REASON USING ASD

AESTHETIC BUILDINGS

- Invisible Detection while remain aesthetic building
  - Cathedrals
  - Museums
  - Antic architecture
  - Modern architecture

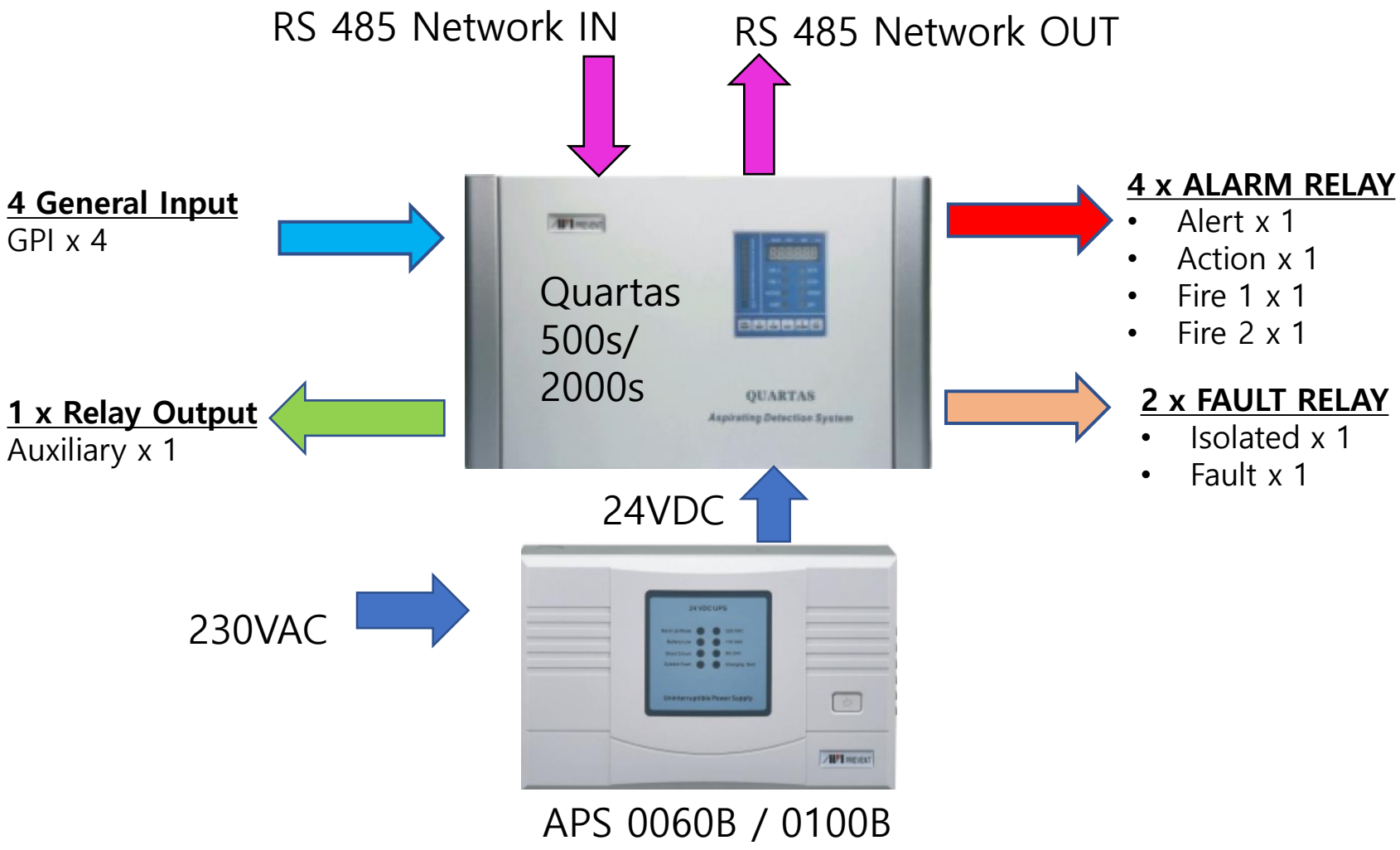
- Only Sampling capillary tube can perform the job !

SMART SMOKE LEVEL algorithm

DIFFICULT ENVIRONMENT

- Very dusty area will shorted the life span of point detector, beam detector drasticall y
  - Recycling Plants
  - Mills
  - Farming
  - Industrial plants
  - Production area
- ASD with external filter can perform the j ob and ASD can equipped with automatic cleaning technology greatly reduce the m aintenance work

AVA ASD CONNECTION OVERVIEW



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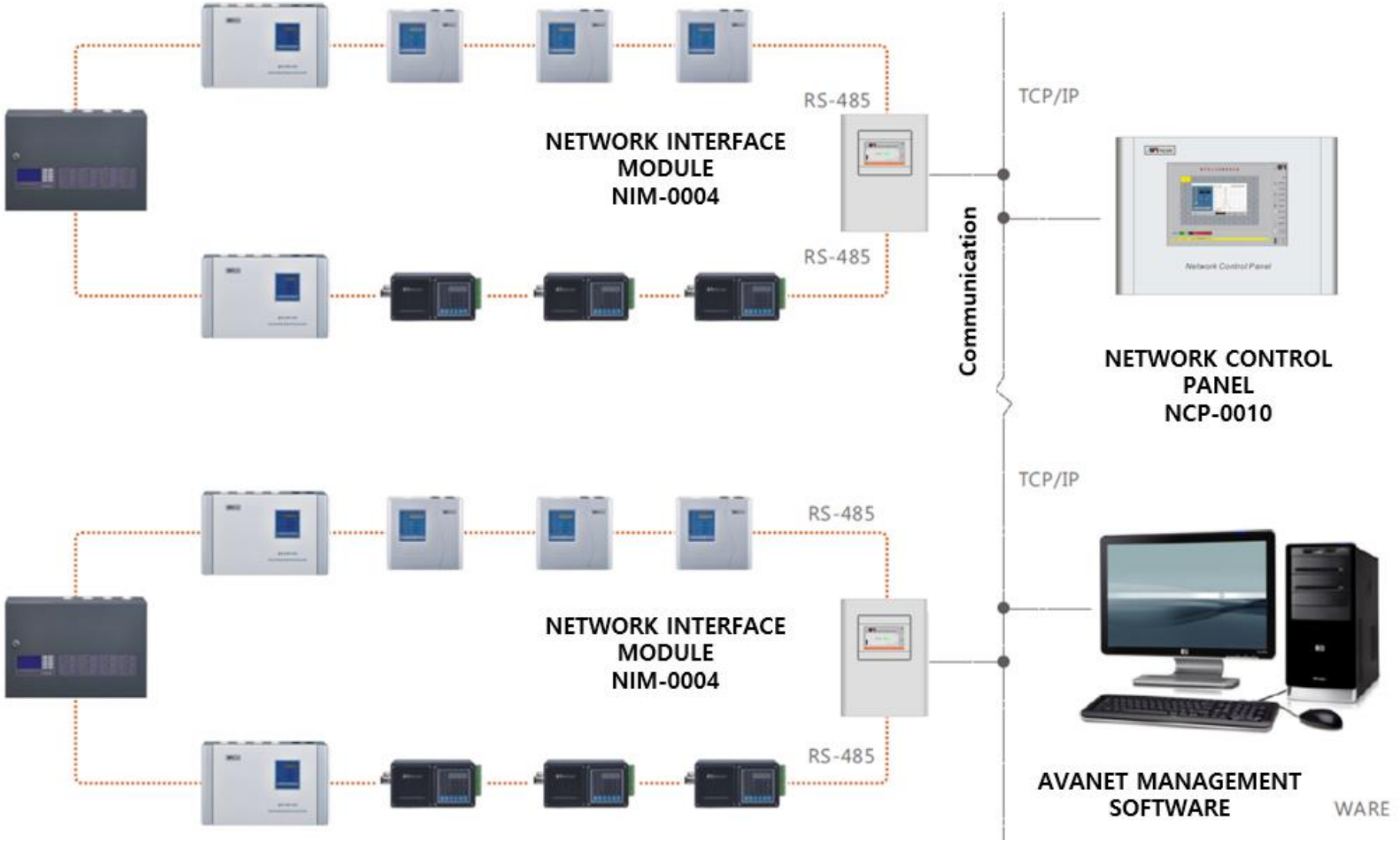
AVA NETWORKING OVERVIEW



AVA ASD MODEL TYPE

FANFARE

QUARTAS-2000s

QUARTAS-500s

CSD-100

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Product Introduction

Quartas-500s (1 pipe ASD)

- **Coverage Area up to 1000 Sqm**
- **1 x Aspirator**
- **1 x Flow Sensor**
- **1 x High Sensitive Smoke Detector**
- **1 x Inlet**
- **1 x Filter**

FRONT DISPLAY

- **Build in Buzzer**
  - Different sound pattern for Alarm and Fault
- **Programmer**
  - Configure ASD Setting
  - Password access level
- **Display**
  - Fire Alarm Indicator (Alert, Action, Fire 1, Fire 2)
  - Fault and Isolation Indicator (Detector / Sensor, Air Flow, System, Auxiliary)
  - 20 Segment Smoke Level BarGraph
  - Real Time Smoke Level & Air Flow Status, Network Address, Event
- **Control**
  - Reset, Isolate, Silence Buzzer, Test button

DETECTION CHAMBER

- 1 Stage Monitored Filter (20 micron) * Filter Efficiency
- Blue LED Large Smoke Chamber with Forward Light Scattering Mass Detection
- Sensitivity Range from 0.001 – 20% obsc/m
- Four Alarm Level Configurable (Alert, Action, Fire 1, Fire 2)

Quartas-500s (1 pipe ASD)

- 24 ±4.8 Vdc
- Max 430mA Current consumption
- Ambient Temperature: 0~40 ℃
- Humidity: 10~95% RH
- 216 x 201 x 92mm

ASPIRATOR

- 10 Speed Adjustable Aspirator
- Air Flow Sensor with Heat Mass Detection Principle
  - High Flow, Low Flow – Threshold Adjustable Sensitivity

INTERFACE

- 24VDC Input
- 7 Relay Outputs @ 2A/30VDC (Configurable Function)
- 4 GPI (Configurable Function)

HIGH LEVEL COMMUNICATION

- RS 485 Network Communication with build in repeater up to 1.2km between ASD
- MODBUS RTU Open Protocol

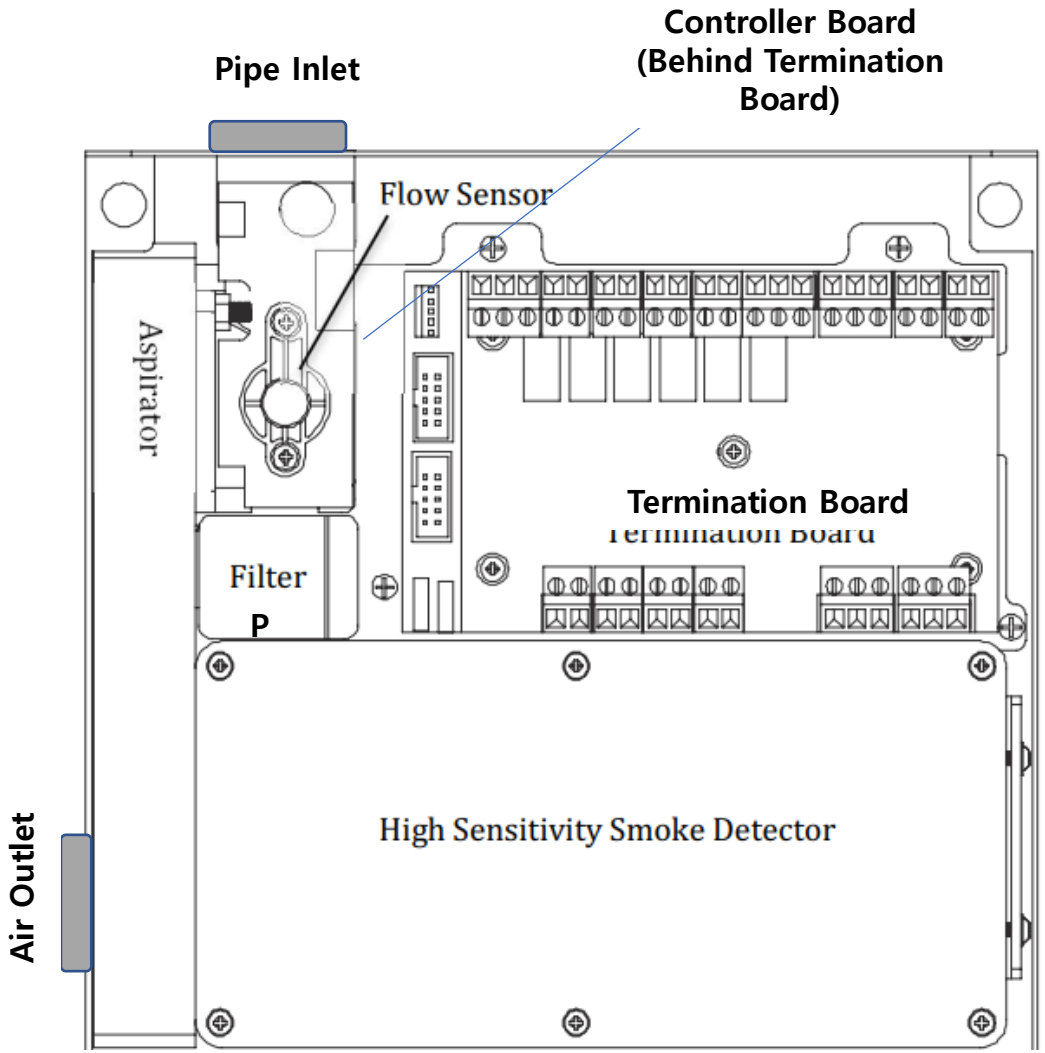
ENVIRONMENT SMOKE LEARNING

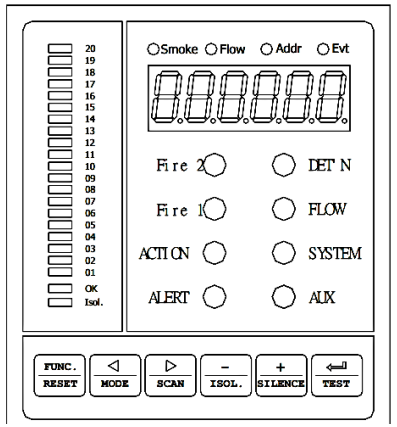
- Relative Fixed Sensitivity - Build in Intelligent Algorithm with 24x7 Non Stop Back Ground L evel Learning

MISCELLANEOUS

- 183,000 Memory – 13,000 Event Log and 170,000 Data Log

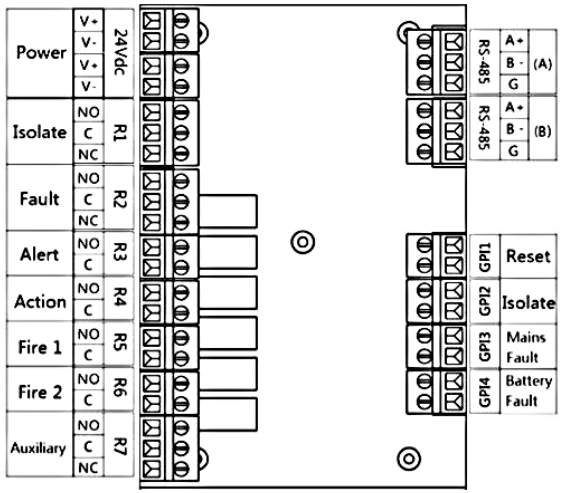
Quartas-500s (1 pipe ASD)





FRONT DISPLAY

- 6 digit numerical Real Time Smoke / Air Flow / Active Event display
- 20 Segment Smoke Bargraph
- Alarm Status (Alert, Action, Fire 1, Fire 2)
- Fault Status (Detector, Flow, System, Aux)
- Control Function (Reset, Silence, Isolate, Test)
- Programmer Function



Termination Board

- 24VDC
- 7 Relays (Alert, Action, Fire 1, Fire 2) Programmable
- 4 GPI (Programmable)
- RS-485 with repeater

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Quartas-2000s (4 pipe ASD)

- **Coverage Area up to 2000 Sqm**
- **4 x Aspirator**
- **4 x Flow Sensor**
- **1 x High Sensitive Smoke Detector**
- **4 x Inlet**
- **1 x Filter**

FRONT DISPLAY

- **Build in Buzzer**
  - Different sound pattern for Alarm and Fault
- **Programmer**
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DETECTION CHAMBER

- 1 Stage Monitored Filter (20 micron) * Filter Efficiency
- Blue LED Large Smoke Chamber with Forward Light Scattering Mass Detection
- Sensitivity Range from 0.001 – 20% obsc/m
- Four Alarm Level Configurable (Alert, Action, Fire 1, Fire 2)

Quartas-2000s (4 pipe ASD)

- 24 ±4.8 Vdc
- Max. 1600 mA Current consumption
- Ambient Temperature: 0~40 ℃
- Humidity: 10~95% RH
- 415 x 259 x 108mm

ASPIRATOR

- 10 Speed Adjustable Aspirator
- Air Flow Sensor with Heat Mass Detection Principle
  - High Flow, Low Flow – Threshold Adjustable Sensitivity

INTERFACE

- 24VDC Input
- 7 Relay Outputs @ 2A/30VDC (Configurable Function)
- Optional 16 Zone Relay Module for Identify Smoke from which Inlet
- 8 GPI (Configurable Function)

HIGH LEVEL COMMUNICATION

- RS 485 Network Communication with build in repeater up to 1.2km between ASD
- MODBUS RTU Open Protocol

ENVIRONMENT SMOKE LEARNING

- Relative Fixed Sensitivity - Build in Intelligent Algorithm with 24x7 Non Stop Back G round Level Learning

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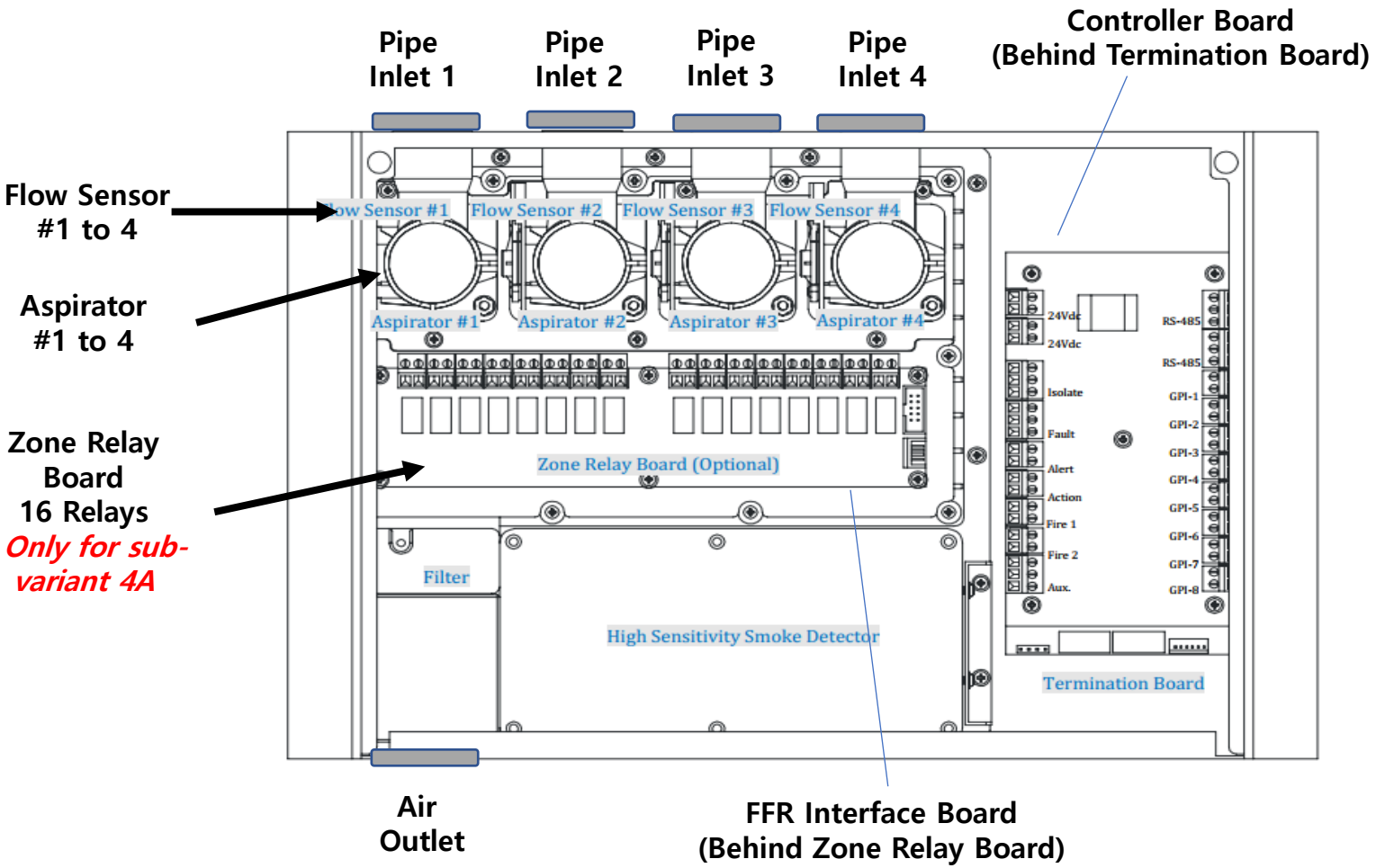

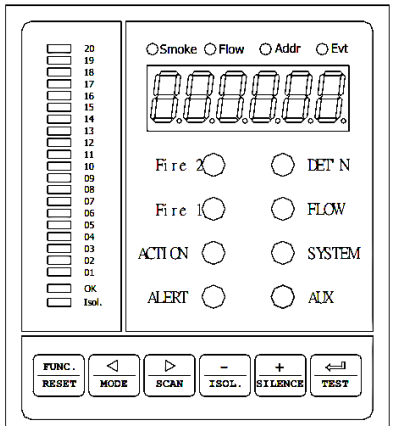

FRONT DISPLAY

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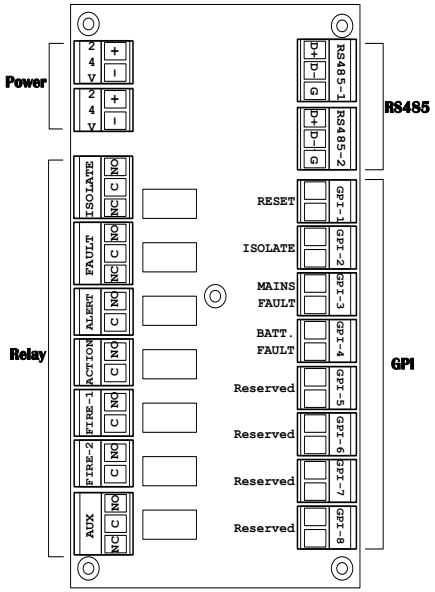

- 24VDC
- 7 Relays (Alert, Action, Fire 1, Fire 2) Programmable
- 8 GPI (Programmable)
- RS-485 with repeater

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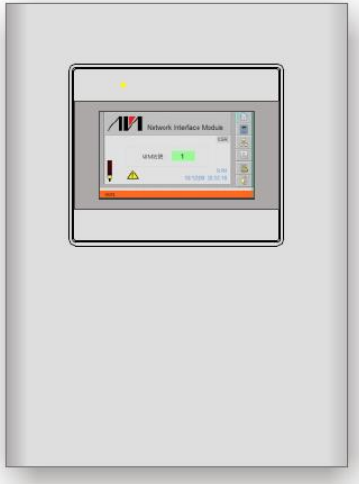
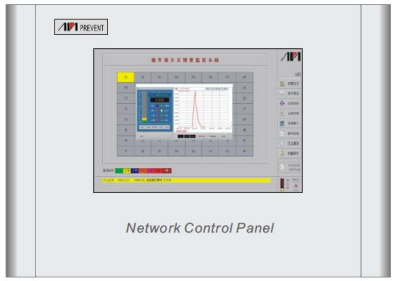
Networking Solution (Current Generation)

Network Interface Module NIM-0004

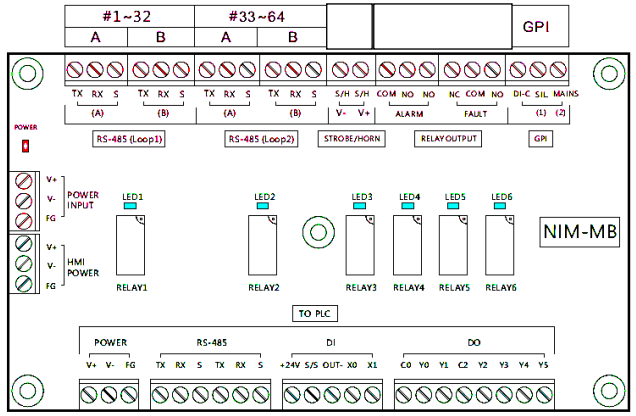


- AVANet Connection Module vi a RS 485 Networking
- 4.3 Inch TFT Touch Screen
- 2 Port connection to AVA ASD
- Each Port 32 units of ASD
- 1 x GPI, 3 x DO, 1 x DI
- 1 x NAC
- IP 30

Network Control Panel NCP-0010



- AVANet Connection Module via RS 485 Networking
- 9.7 Inch TFT Touch Screen
- Auto switch to Alarm Floor Plan
- Real time and History Smoke Graph
- 20 Smoke Level Bargraph
- 2 Port connection to AVA ASD
- Each Port 32 units of ASD
- 2 x GPI, 3 x DO, 1 x DI
- 1 x NAC
- IP 30



Overview of Function / Termination inside NIM / NCP

- AVANet Connection Module via RS 485 Networking
- MODBUS Output (TCP/IP or RS 485)
- Password Access Control
- Parameter Setting on all AVA Device
- Event Read out from all AVA Device
- COM Port : RS 232, TCP/IP

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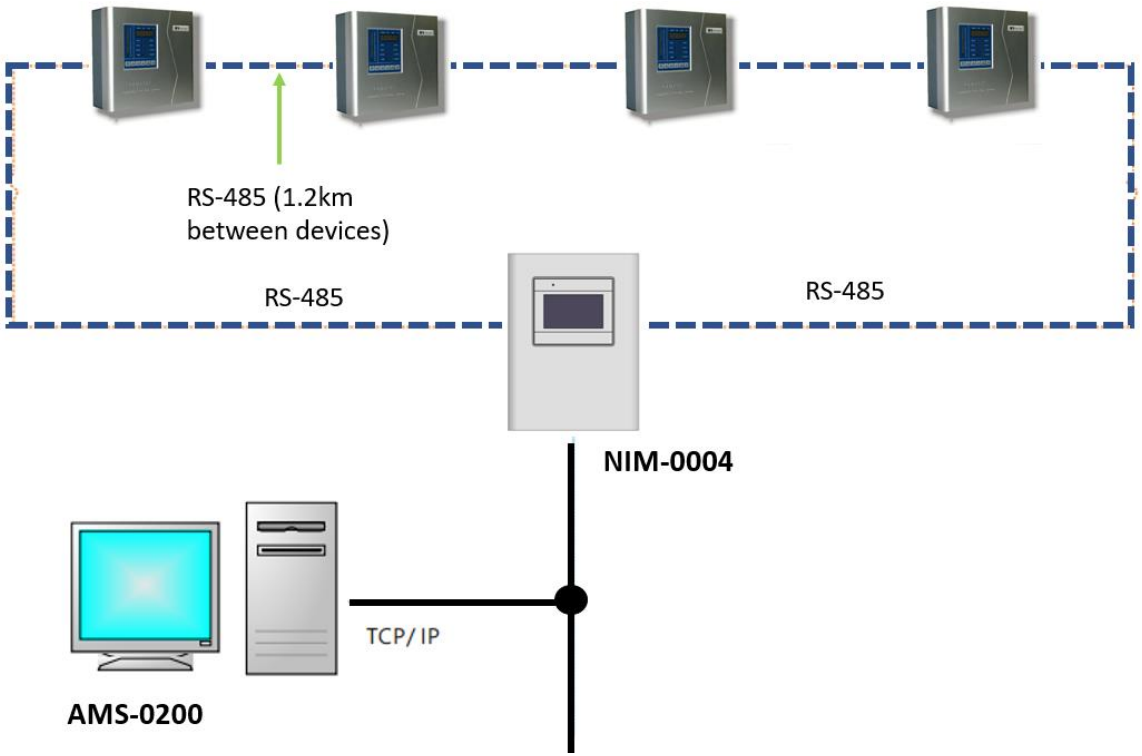
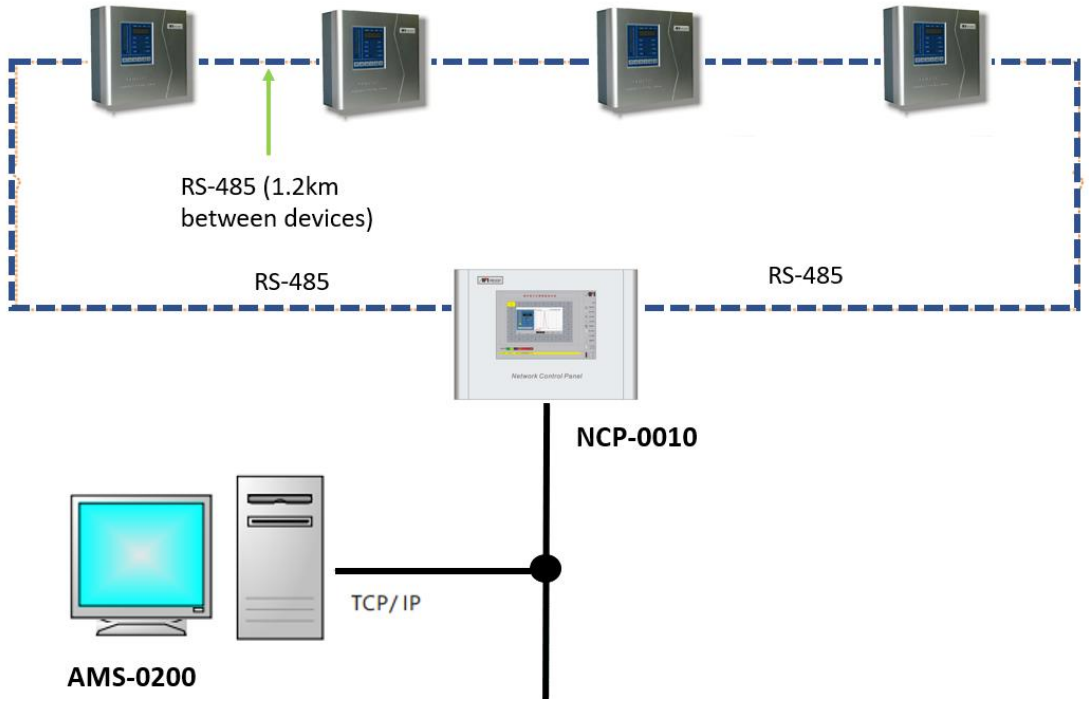
Networking Solution (Current Generation) – Single Network





NIM-0004

- Each Loop Maximum 32 number of ASD
- Each Panel consist of 2 Loop (Total 64 ASD)
- Panel Network can connect up to 16 nos NIM
- Total AVA Net Management control up to 1024 nos of ASD

NCP-0010

- Each Loop Maximum 32 number of ASD
- Each Panel consist of 2 Loop (Total 64 ASD)
- Panel Network can connect up to 16 nos NCP
- Total AVA Net Management control up to 1024 nos of ASD

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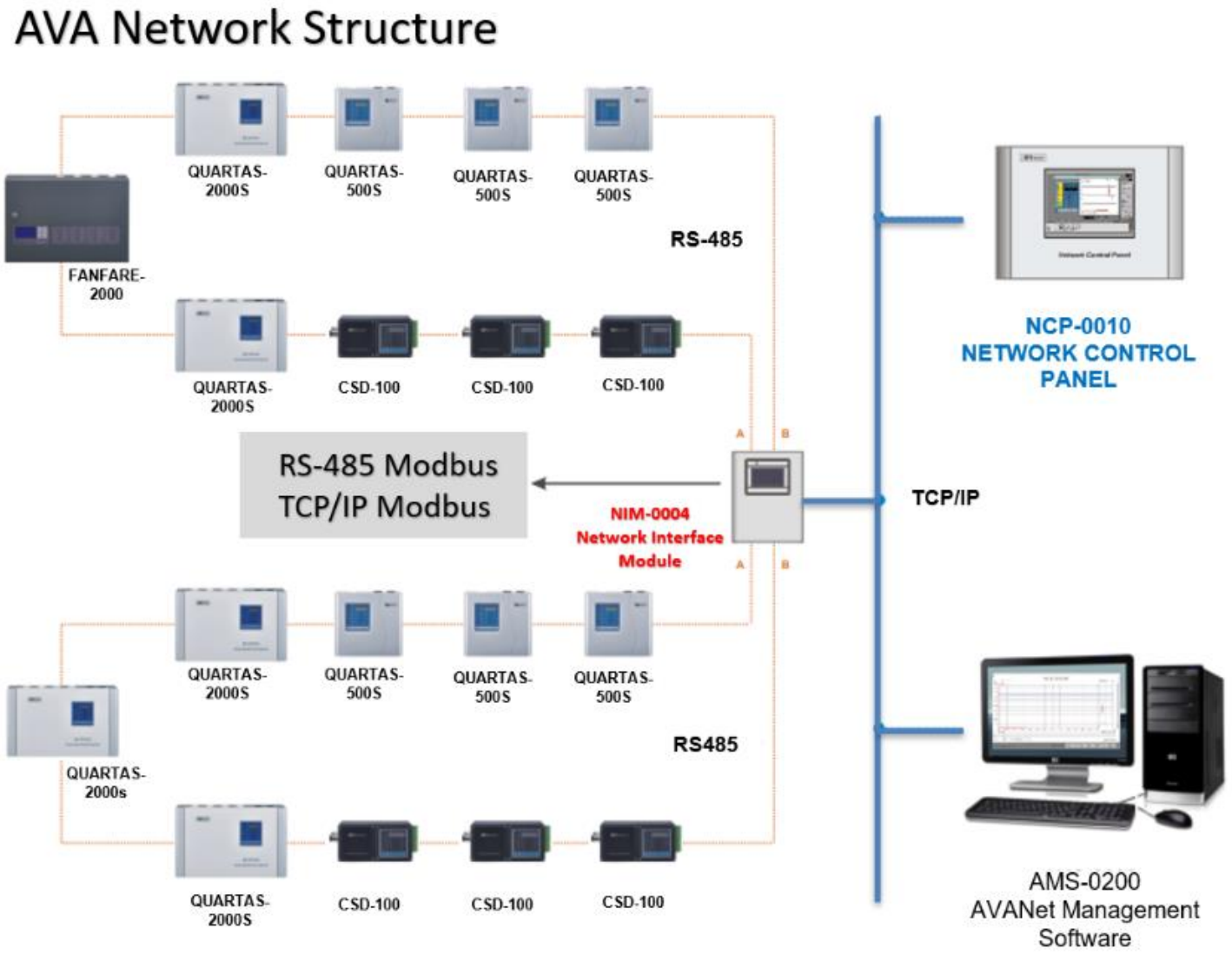
Networking Solution (Current Generation) – Multiple Network



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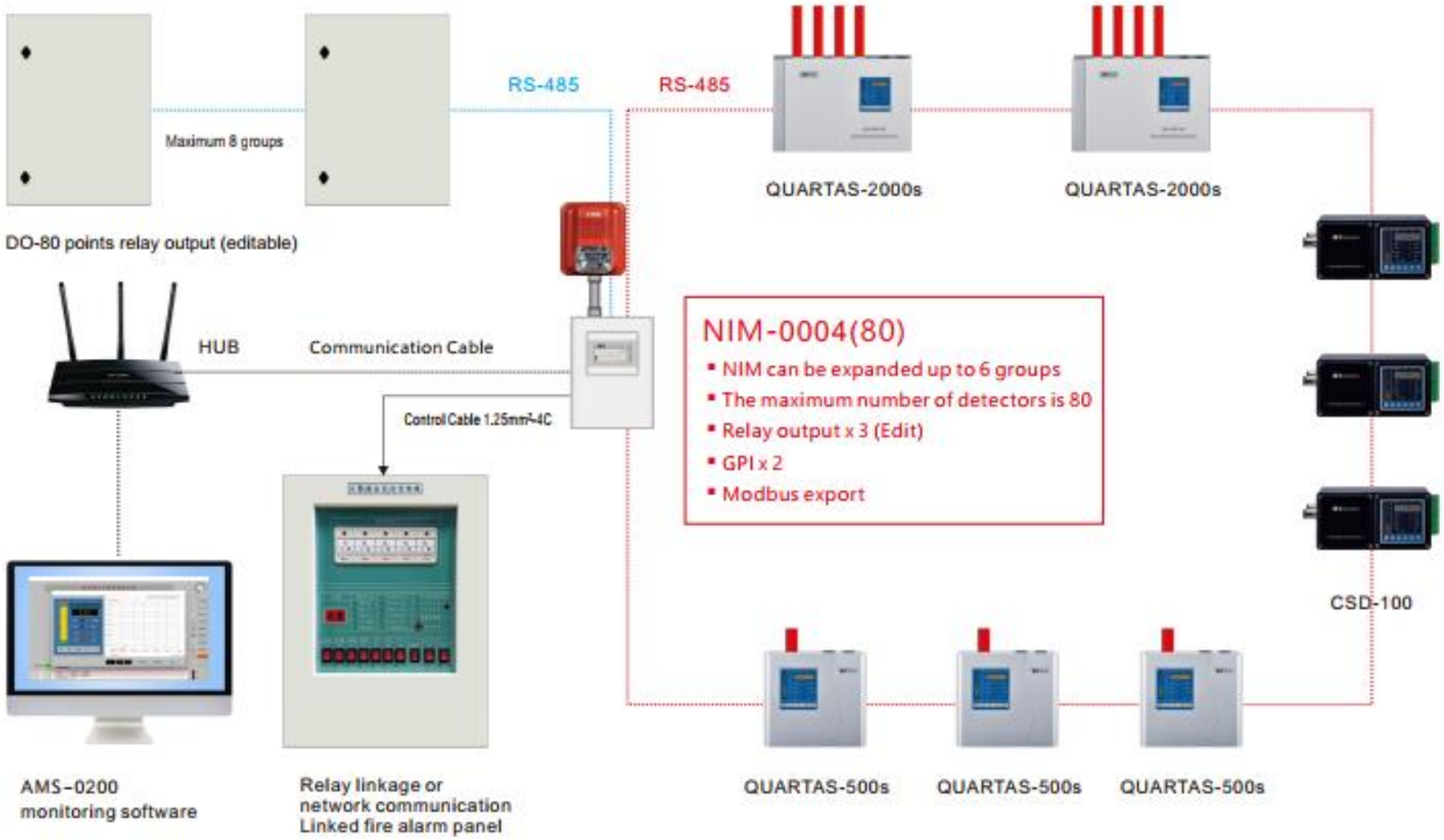
Networking Solution (Next Generation)

Network Interface Module
- **NIM-0300 (without Display connect via HDMI)**
- **NIM-0304 (with 4.3 inch display)**

Network Control Panel
- **NCP-0310 (with 10 inch display)**
- **NCP-0315 (with 15 inch display)**

Upgrade
- 1 Loop of 80 units of ASD instead of 2 loops of 32 units of ASD
- Optional connection to Digital Output Module (80 Digital Output)
- i-Phone and Android APP Support

Networking Solution (Next Generation)



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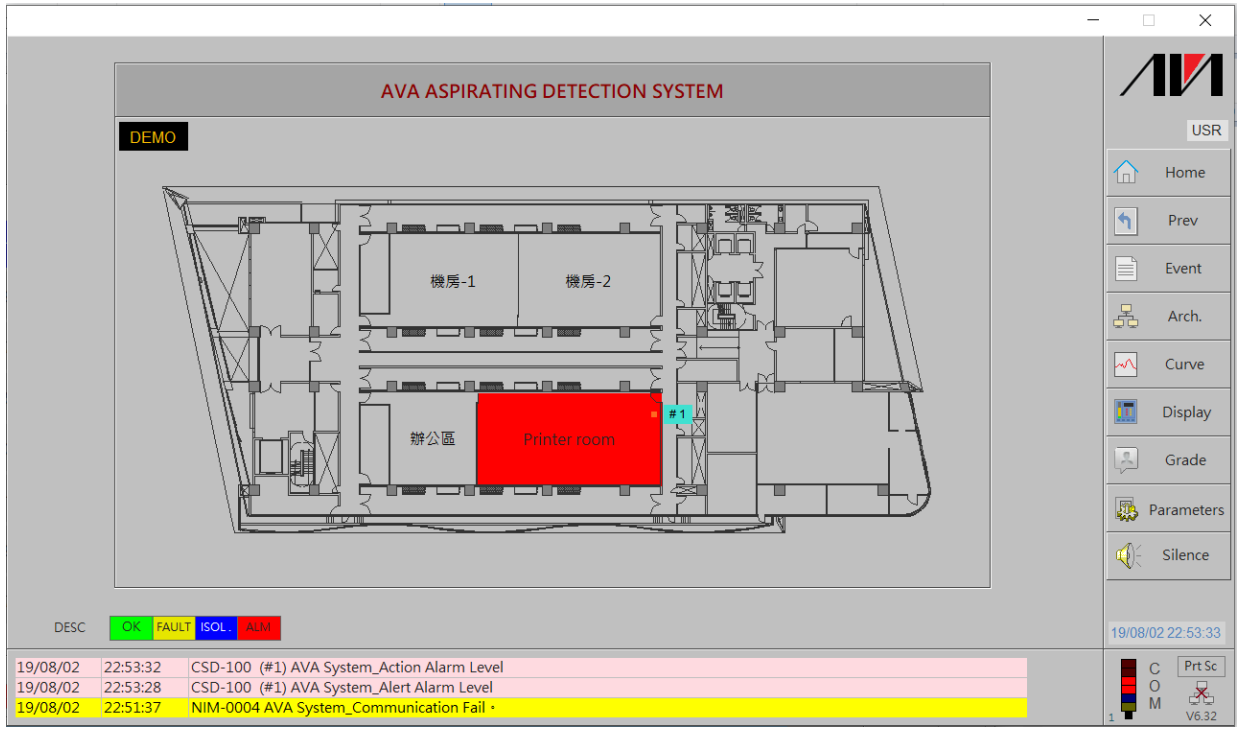
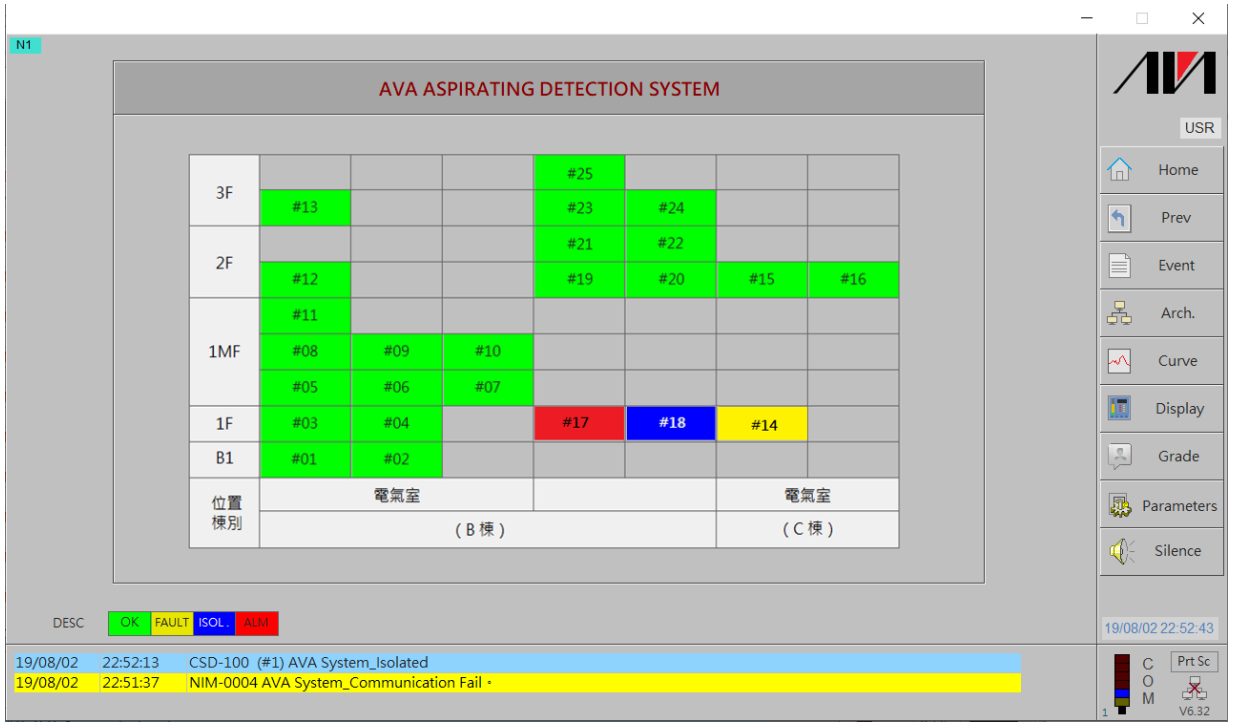
AVA Management Software AMS





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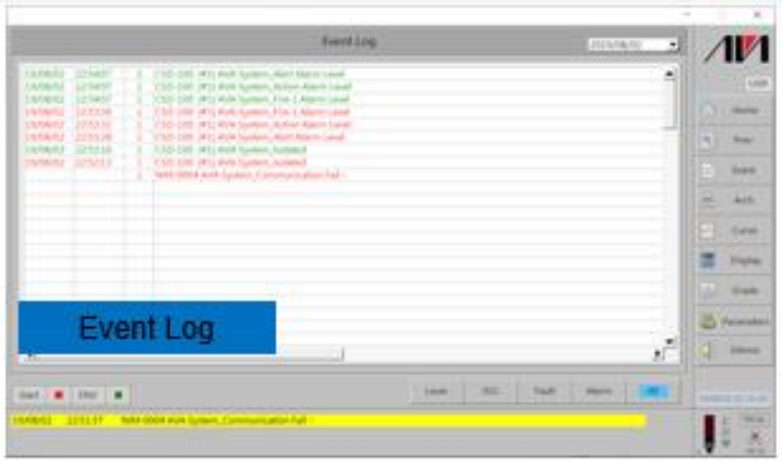

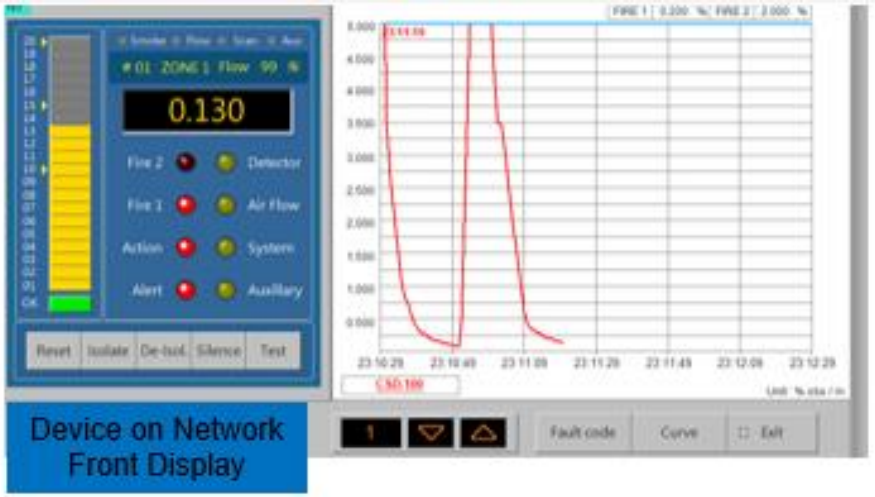

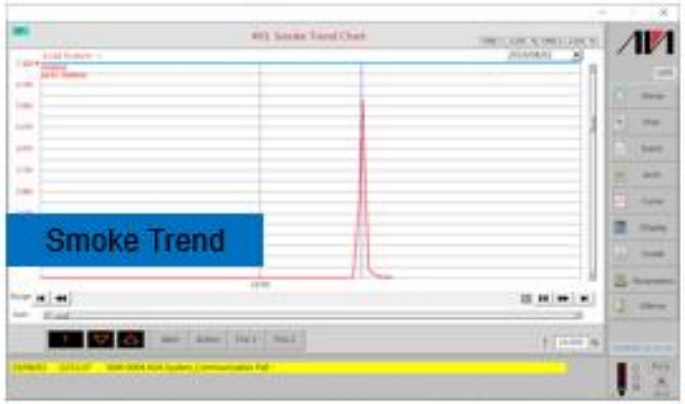

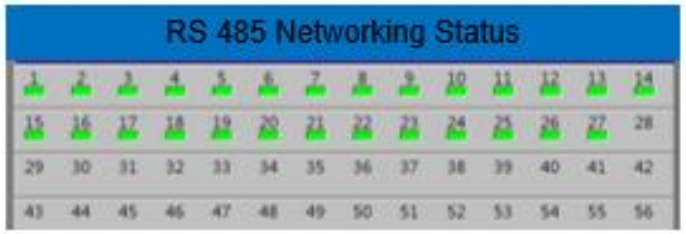

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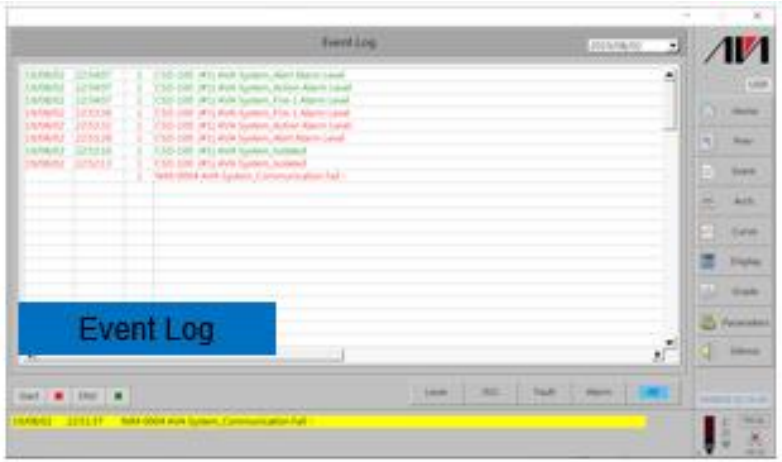

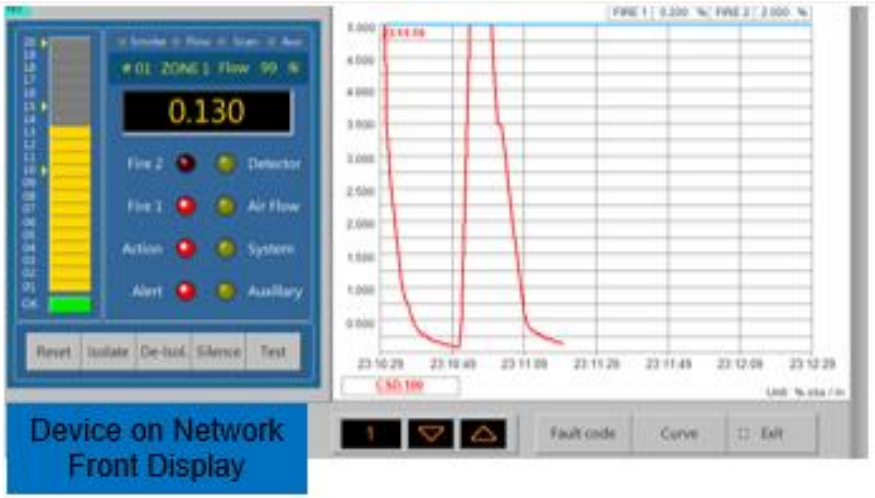

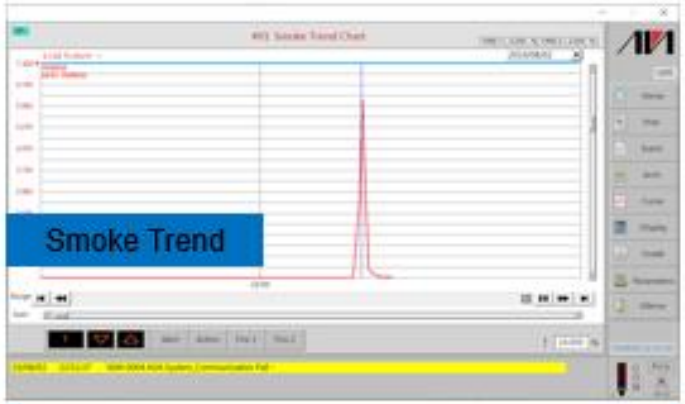

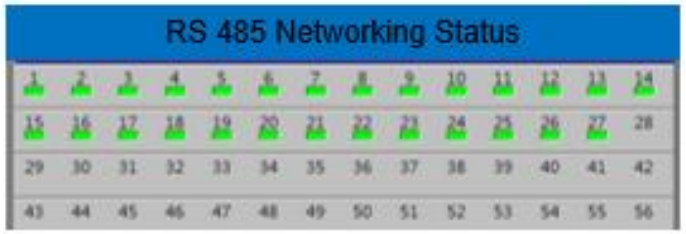

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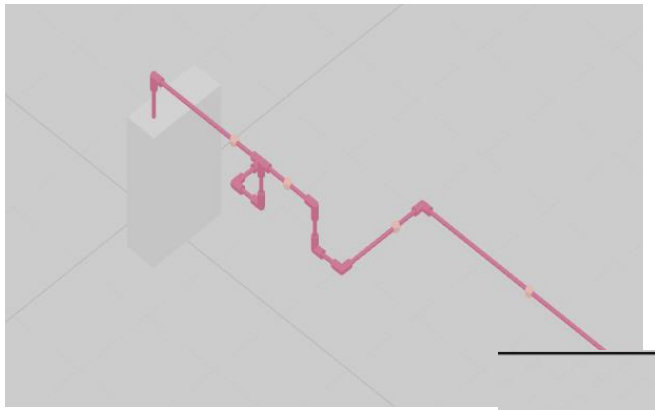
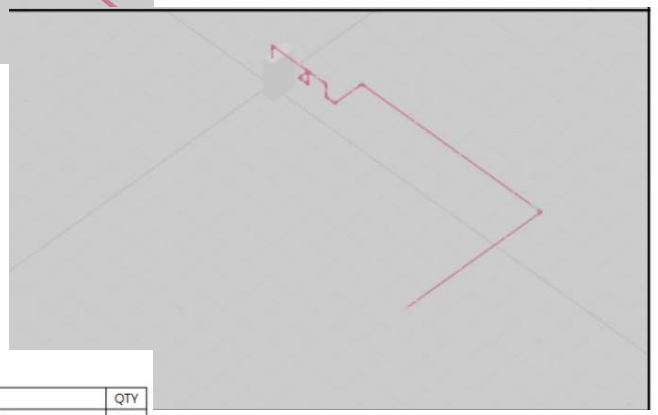
AVA Flow – Calculation Software

Calculation Result

Pipe1-1 | BOM

Items	Position	Spacing	Bend	Hole Size (mm)	Hole Type	Capillary Tube (m)	Flow (m/s)	Flow (%)	Pressure (Pa)	Sensitivity (%/m)	Time (s)
Main Trunk	0				Sample Point						
Branch Trunk	0										
Hole 1	4	4	1	2	Sample Point	0	2.41	9.02	187	0.55	1.6
Hole 2	9	5	0	2	Sample Point	0	2.19	8.51	182	0.59	3.9
Hole 3	14	5	0	2	Sample Point	0	1.99	8.06	177	0.62	6.4
Hole 4	19	5	0	2	Sample Point	0	1.79	7.67	172	0.65	9.2
Hole 5	24	5	0	2	Sample Point	0	1.61	7.35	168	0.68	12.3
Hole 6	29	5	0	2	Sample Point	0	1.43	7.08	163	0.71	15.8
Hole 7	34	5	0	2	Sample Point	0	1.26	6.86	159	0.73	19.8
Hole 8	39	5	0	2	Sample Point	0	1.09	6.7	155	0.75	24.4
Hole 9	44	5	0	2	Sample Point	0	0.93	6.57	151	0.76	29.7
Hole 10	49	5	0	2	Sample Point	0	0.77	6.52	147	0.77	36.2
Hole 11	50	1	0	4	Sample Point	0	0.62	25.66	144	0.19	37.8
Hole Balance (%)	72		Hole Percent (%)	74		Time (s)	37.8		Result	PASS	Best Balance





AvaFlow Report

Model : QUARTAS-500s
Project Name :
Address :
Date :
Installer by :
Contact :
Comment :

Detection Pipe :
Dwg ref :
Designed by :
Telephone :

Summary

Model	Main Trunk	Branch Trunk	Pipe/Branch Length (m)	No. of Holes	Hole Size (mm)	End Hole Size (mm)	Worst Sensitivity	Hole Balance (%)	Hole Percent (%)	Max. Transport	Result
P1-1	0	0	50	11	2	4	2.4	72	74	37.8	PASS

Conclusion
The calculation results meet the following criteria.
Sensitivity 5%/m
Maximum Transport Time 120s
The conclusion is PASS.

Comments
1. The calculation is based on the following detector settings
Alarm Level (%/m) 0.05
Fan Speed 10
2. Total Pipe Length(m): 50.0
Total Number of Holes: 11
3. NFPA 72 Maximum Alarm Level (%/m)
Alarm 0.325

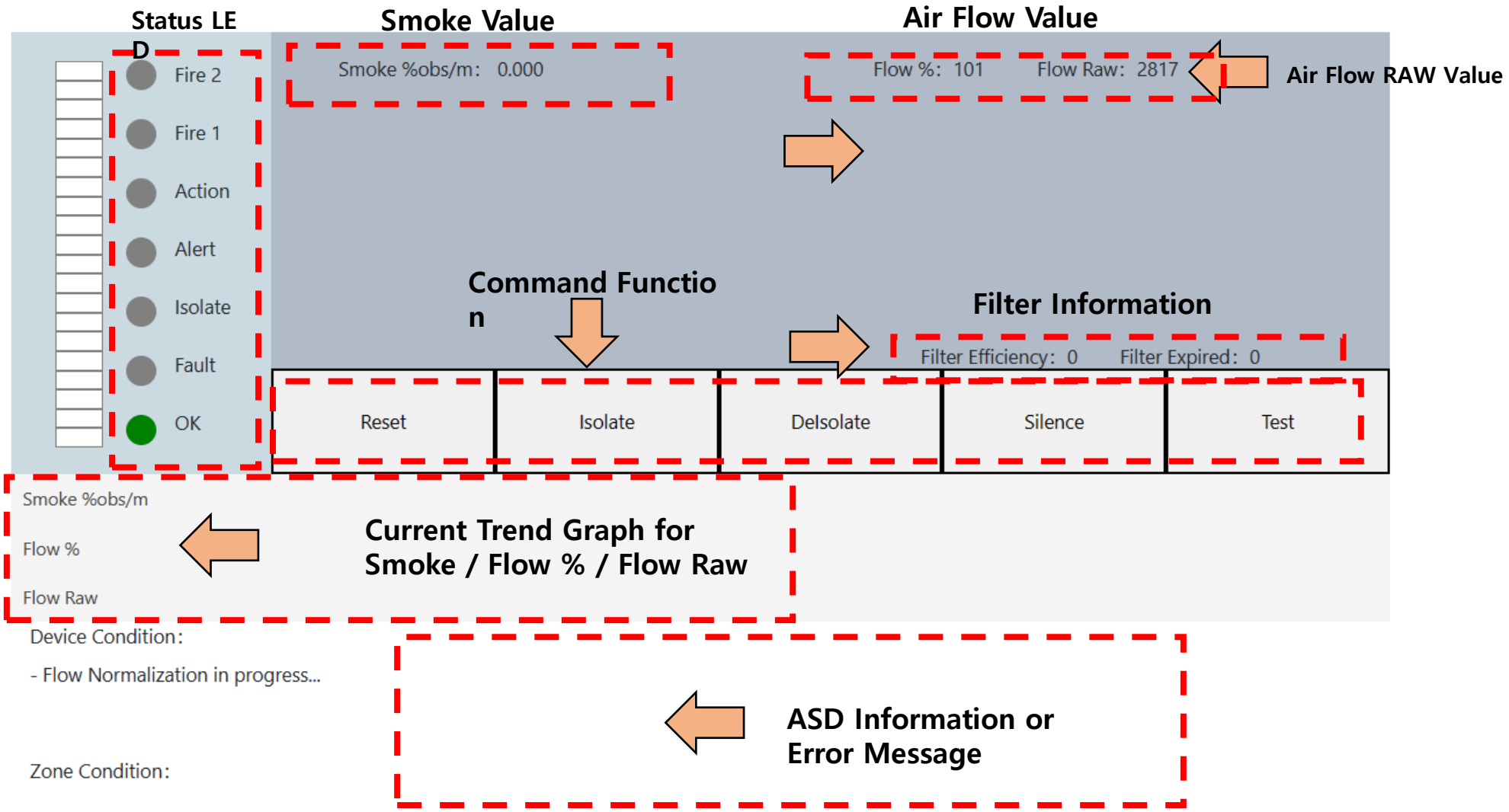
P1-1, Pipe 1 Branch 1 Calculation

Item	Position	Spacing	Bend	Hole Size (mm)	Hole Type	Flow (m/s)	Flow (%)	Sensitivity (%/m)	Pressure (Pa)	Time (s)
Main Trunk	0.0		0							
Branch Trunk	0.0		0							
Hole 1	4.0	4	1	2	Sample Point	2.4	9.0	0.6	187	1.6
Hole 2	9.0	5	4	2	Sample Point	2.2	8.5	0.6	182	3.9
Hole 3	14.0	5	3	2	Sample Point	2.0	8.1	0.6	177	6.4
Hole 4	19.0	5	1	2	Sample Point	1.8	7.7	0.7	172	9.2
Hole 5	24.0	5	0	2	Sample Point	1.6	7.3	0.7	168	12.3
Hole 6	29.0	5	0	2	Sample Point	1.4	7.1	0.7	163	15.8
Hole 7	34.0	5	0	2	Sample Point	1.3	6.9	0.7	159	19.8
Hole 8	39.0	5	1	2	Sample Point	1.1	6.7	0.8	155	24.4
Hole 9	44.0	5	0	2	Sample Point	0.9	6.6	0.8	151	29.7
Hole 10	49.0	5	0	2	Sample Point	0.8	6.5	0.8	147	36.2
Hole 11	50.0	1	0	4	Sample Point	0.6	25.7	0.2	144	37.8

Bill of Materials

Product	Part No.	Description	QTY
	ASP-0001	Standard Sampling Point Label per 6	0
	ASP-0002	Sampling Hole Label per 10	2
	ASP-0003	Brass Sampling Point (hole saze: 2mm)	0
	ASP-0004	Pneumatic Fitting (for Tap Connector Thread 1/2)	0
	ASP-0005	Standard Sampling Point Assembly(Bead Sampling Point - Washer - Nut)	0
	ASP-0006	ABS Air Sampling Pipe RED -4m (O/D: 25mm I/D: 21mm)	13
	ASP-0007	ABS Socket Red	12
	ASP-0008	ABS 45 deg. Elbow Red	2
	ASP-0009	ABS End Cap Red	1
	ASP-0010	ABS Tee Socket Red	0
	ASP-0011	PU Tube 5/8mm (100m/Roll)	0
	ASP-0012	Connector	0
	ASP-0013	Tube Sampling Point	0

AVA Tool – Configuration Software



AVA PREVENT
Aspirating Cabinet Smoke Detection

AVA Tool – Configuration Software

Address: 250 Port: COM7 Upload log from: 09/02/2023 Upload

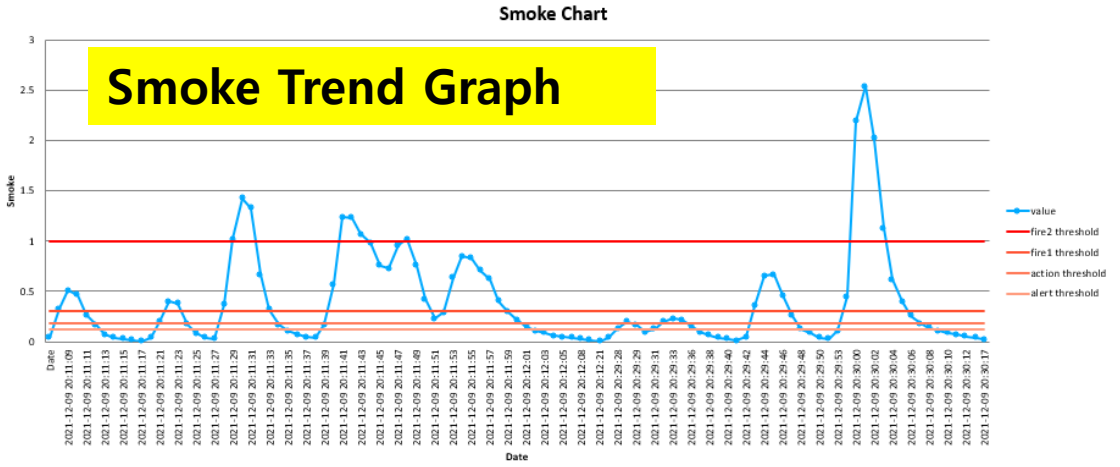
Query time range Start date To End date Export Excel

Event | Smoke | Flow | Aux. | All

Upload History

Search Table

Date	Zone	Event	Value
2023/02/09 20:56:58	Zone1	Flow	101
2023/02/09 20:56:58	Zone1	Smoke	0.000
2023/02/09 20:55:11	Zone1	Smoke	0.000
2023/02/09 20:55:11	Zone1	Flow	105
2023/02/09 20:55:08	Zone1	Flow	105
2023/02/09 20:55:08	Zone1	Smoke	0.000
2023/02/09 20:54:13	Zone1	Smoke	0.000
2023/02/09 20:54:13	Zone1	Flow	105



Date	zone	Event	Description
2021-12-09 19:25:18	Device	Operation	Power On
2021-12-09 19:25:18	Device	Alarm	Alert Level (End)
2021-12-09 19:25:18	Device	Alarm	Action Level (End)
2021-12-09 19:25:18	Device	Alarm	Fire Level 1 (End)
2021-12-09 19:25:18	Zone 1	Operation	Normalize Start
2021-12-09 19:25:18	Zone 2	Operation	Normalize Start
2021-12-09 19:25:18	Zone 3	Operation	Normalize Start
			lize Start
			via web

EVENT LOG

Date	zone	value	fire2 threshold	fire1 threshold	action threshold	alert threshold
2021-12-09 20:11:08	Zone 1	0.042	1	0.3	0.18	0.12
2021-12-09 20:11:09	Zone 1	0.327	1	0.3	0.18	0.12
2021-12-09 20:11:10	Zone 1	0.511	1	0.3	0.18	0.12
2021-12-09 20:11:11	Zone 1	0.467	1	0.3	0.18	0.12
2021-12-09 20:11:12	Zone 1	0.265	1	0.3	0.18	0.12
2021-12-09 20:11:13	Zone 1	0.171	1	0.3	0.18	0.12
2021-12-09 20:11:14	Zone 1	0.071	1	0.3	0.18	0.12
2021-12-09 20:11:15	Zone 1	0.041	1	0.3	0.18	0.12
2021-12-09 20:11:16	Zone 1	0.025	1	0.3	0.18	0.12
2021-12-09 20:11:17	Zone 1	0.013	1	0.3	0.18	0.12
2021-12-09 20:11:18	Zone 1	0.003	1	0.3	0.18	0.12
2021-12-09 20:11:21	Zone 1	0.038	1	0.3	0.18	0.12
2021-12-09 20:11:22	Zone 1	0.198	1	0.3	0.18	0.12
				0.3	0.18	0.12
				0.3	0.18	0.12

SMOKE LOG

AVA PREVENT
Aspirating Cabinet Smoke Detection

UPS and Accessories

APS 0060B – UPS 24VDC / 50 W

APS 0100B – UPS 24VDC / 100 W

- Build in Voltage Regulator and current limitation protection
- LED
  - AC Available LED
  - DC Available LED
  - Battery Low LED
  - Charging LED
- Output
  - Fault Relay (AC/Battery Failure)
- Protection
  - Overload Fuse
  - Short Circuit Protection

AVA PREVENT
Aspirating Cabinet Smoke Detection

Product Features Highlight

AVA UNIQUE TECHNOLOGIES

Smart Smoke Level (S.S.L) Intelligent Algorithm

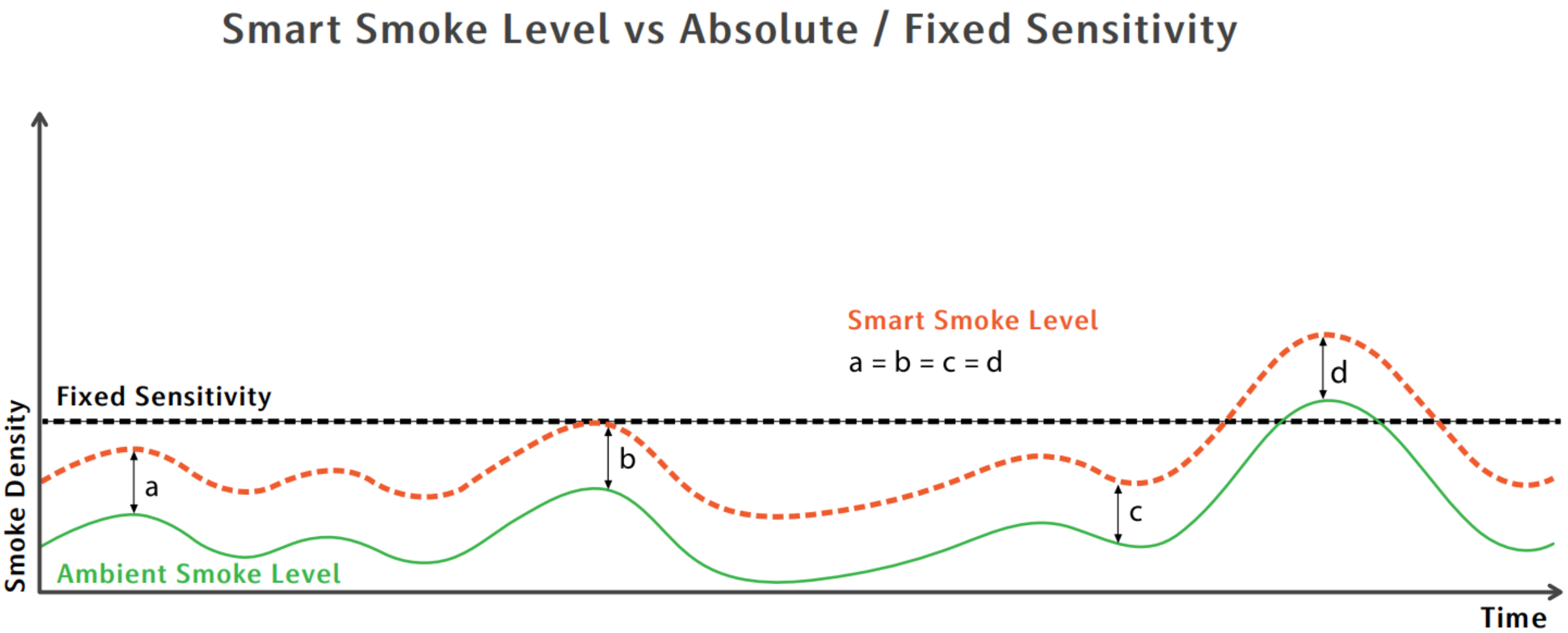
High Power Blue LED & Large Volume Smoke Detection

AVA ASD

Independent Aspirator Multi Channel ASD

Front Display DCP
- ❖ Display
- ❖ Control
- ❖ Programmer

SMART SMOKE LEVEL algorithm



AVA PREVENT
Aspirating Cabinet Smoke Detection

SMART SMOKE LEVEL algorithm

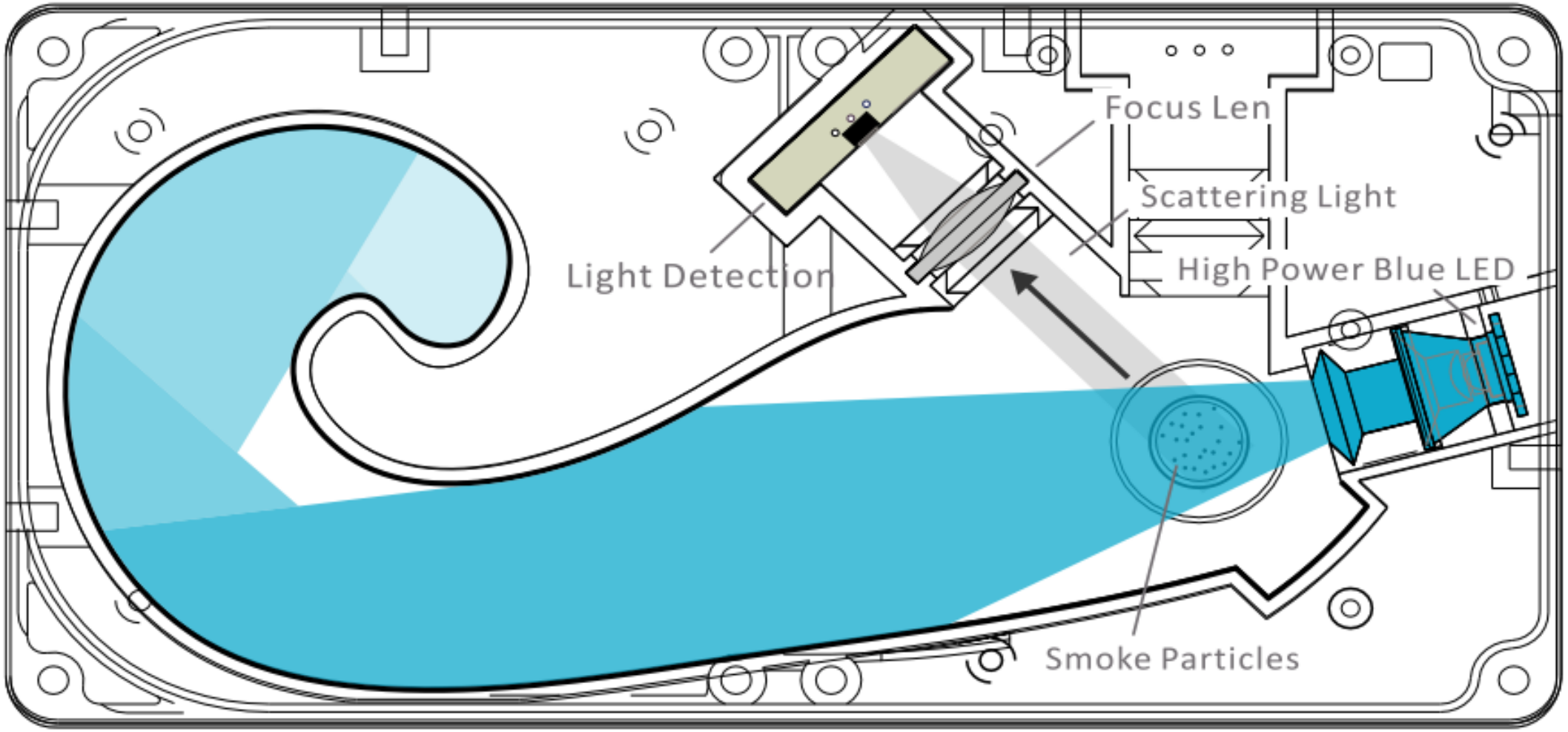
AVA's ASD System has a built-in SSL algorithm. This algorithm will constantly collect the alterations on the background smoke value and calculate the average value of the background smoke concentration over a period of time, which is then used as the reference point for the smoke concentration and alarm threshold. When a re occurs, the smoke particles in the air will multiply due to the material combustion and will cause the smoke concentration detected by the HSSD to increase from the background average (reference point), and when the smoke concentration exceeds the alarm threshold, AVA's ASD system will turn into "Fire Alarm Stage"

In fact, the real time smoke concentration and alarm threshold displayed by the AVA's ASD system is a relative value, "relative" to the background average smoke over a period of time, so we also call SSL a "Relative Scale" system.

Advantages of SSL

- **Maintains a Consistent Performance:** As it can be seen on graph figure of SSL performance, the scale system alarm value is related to the smoke background value, that way, the smoke required to reach is fixed.
- **Greatly Reduces False Alarms:** Since the ASD system continuously analysis the environment in the background, it will NOT create any false alarms due to the normal Non-Fire condition change in the background value.
- **Extremely Simple Testing and Commissioning :** The SSL relative scale algorithm will start automatically when the ASD is switched-on. The SSL will be working non-stop 24 hours for 365 days and will adjust the limit level, making the commissioning of AVA's ASD extremely simple
- **Easy to Spot any Anomalies:** Since the SSL algorithm continuously learns about the environmental background as the reference point (zeroing), any change above the background average is easily noticed, and thus, it could provide a Very Early Warning signal

AVA HIGH SENSITIVE SMOKE CHAMBER



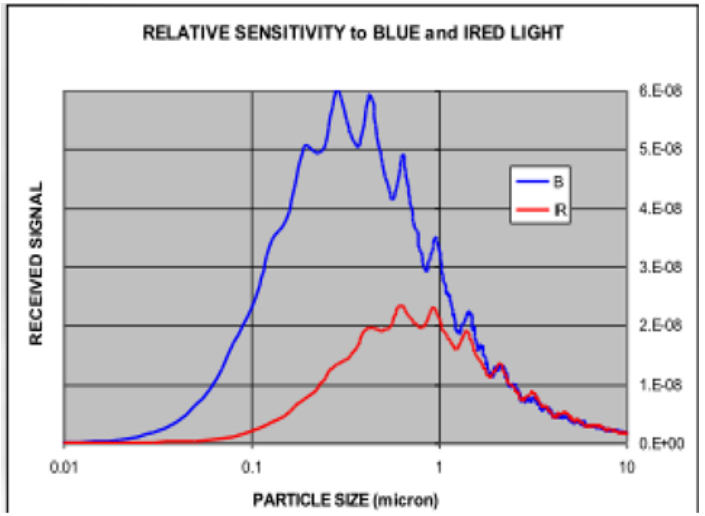
AVA PREVENT
Aspirating Cabinet Smoke Detection

High Power Blue LED

AVA's High-Sensitive Smoke Detector (HSSD) uses a High Power Blue LED as the detection light source. The characteristics of the Blue LED meet the basic requirements for this detection light source such as high brightness and long life span.
The short wavelength of 470nm blue light is more responsive and sensitive to smaller size particles, therefore, the Blue LED can provide the most effective detection from the tiniest size particles to large particle.

We can say that the High Power Blue LED combines the advantage of the first-generation ASD xenon light source together with the second-generation infrared laser, however, it does not carry the same problems from the 1st generation xenon, that has a short life span, or the 2nd generation infrared laser with a longer wavelength that is not sensitive to small particles of the shortcomings.

Based in these facts, the Blue LED is the ideal detection light source for a high-sensitive smoke detector



Advantages of High Power Blue LED

- **High Power :** Extra Bright Light Source.
- **Blue LED :** Shorter wavelength of 470nm compare to Infrared with longer wavelength of 760nm**.**
  - **Small Particle Size Response :** Theoretically intensity of scattered light of Blue LED light is 6.8 times better than IR Light
  - **Large Particle Size Response** when using Mie scattering to calculate the scattered light. It would mean scattered light intensity of Blue LED is 2.6 times better than Infra Red light

AVA Large Volume Smoke Chamber

AVA's High-Sensitive Smoke Detector (HSSD) with Large Volume Smoke Chamber and forwarder scattered light principle is performing "Three-Dimensional" evaluation of the air sample compare to detection "point"

AVA's blue LED can irradiate simultaneously all the air participle inside the HSSD smoke chamber, so each air particle inside the chamber can contribute to the scattered light resulting the total scattered light signal is substantially bigger with air sample contains large amount of particle for evaluation.

Moreover, the scattered light intensity is proportional to the total mass of particles, which is more accurate representation of the actual smoke concentration in the air.

The large volume smoke chamber can help to reduce the effects of air movement and turbulence for smoke evaluation, resulting smoke evaluation stability and accuracy.
Smaller smoke chamber, air movement and turbulence can cause fluctuation in the concentration of smoke particles which might result in false alarm or miss detection.

Advantages of AVA Large Volume Smoke Evaluation Chamber

- **Forward scattered Light :** Increase speed and accuracy of smoke detection with large amount of light being scattered and detected.

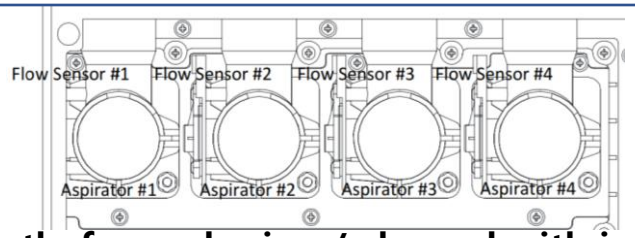
- **Large Volume:**
  - Able to perform Three Dimension Evaluation
  - Reduce effect of Air sample Movement and Turbulence

- **Less Air Path to HSSD** : AVA HSSD is engineer to allow around 10% of air particle from environment sample air for evaluation.
  - Smoke chamber not easily get polluted by dust

Aspirator Independent Quartas-2000s

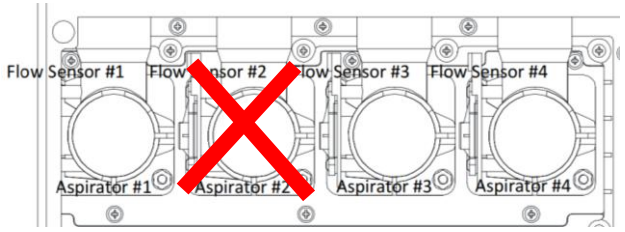
AVA's Quartas-2000s come with 4 independent Aspirator and Air Flow Sensor.
Each Aspirator and air flow sensor can have different parameter configuration.

Normal Conditions



Work Independently for each pipe / channel with individual aspirator and air flow sensor

1 Aspirator Failure



IF one Aspirator Failed – Fault signal for individual Fan will be indicated

The remaining 1 Aspirating still working

If your project, use only 3 pipes, you can switch to Pipe 4 and there is NO LOST Of Protection

Advantages with Independent Aspirator

- **Minimize Lost of Protection:** One failure of aspirator will not affect the other pipe and normal operation / evaluation will continue for other pipe inlet
- **Independent parameter setting for each aspirator and air flow sensor:**
  - Aspirator speed and air flow threshold (High / Low) can be set independently for Aspirator 1, 2, 3, 4. This provide the flexibility for multi-channel for different area of protection that require different aspirator speed.

AVA PREVENT
Aspirating Cabinet Smoke Detection

Front Display “DCP”

AVA ASD come with 3 in 1 Front Display / Control / Programmer

LED Indication and Buzzer

- ❑ AVA ASD have clear LED for most easier indication of event
  - Fire Related LED (20 segment bar graph), Alert, Action, Fire 1, Fire 2
  - Fault related LED (Detector, Air Flow, ASD unit
  - Miscellaneous related LED (AUX, Isolate)
- ❑ AVA ASD have 6 digit numerical LED to show real time Smoke value and air flow value and active event code.
- ❑ AVA ASD have build in buzzer to alert with different sound pattern for Alarm and Fault

Control Function

- ❑ AVA ASD come with “RESET”, ISOLATE”, “SILENCE” and “TEST Button function

Programmer Function

- ❑ AVA ASD equipped with programmer function to simplify parameter configuration changes and give simplest commission method and convenient to our working partner.
- ❑ Only With security access code entry on the Front panel will allow to change configuration. All this parameter configuration can be achieved WITHOUT the need of a PC with license code / dongle.
- ❑ Parameter include Alarm Threshold, Air Flow, Relay, GPI, Filter status, date and time, system related.

Front Display “DCP”

DISPLAY information

Display Real Time Smoke Value

- This is one of the important factor when emergency response team to know whether Smoke / Fire is still happening or Smoke / Fire HAD happened

Smoke Alarm Signal

- 20 segment smoke bargraph
- Alert, Action, Fire 1, Fire 2 LED

Real Time Air Flow Value

- Easy maintenance

Active Event Code with Date and Time

- Easy maintenance

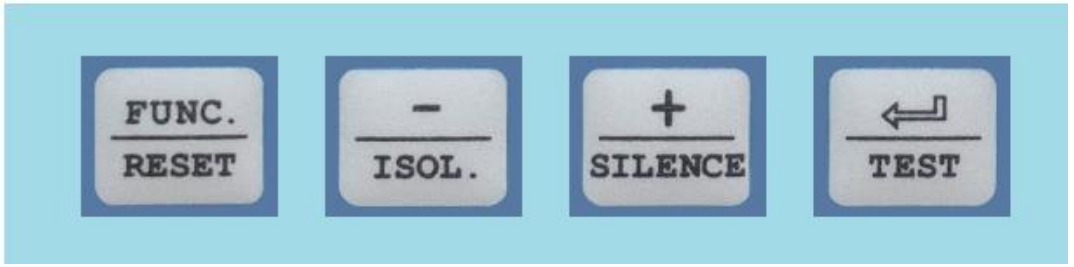
Full Fault LED Status (Isolate, Detector, Air Flow, System)

- Easy overview of ASD condition

AVA PREVENT
Aspirating Cabinet Smoke Detection

Front Display “DCP”

CONTROL Function



Control Function

- Can perform control function on the ASD from the control button

AVA PREVENT
Aspirating Cabinet Smoke Detection

Front Display “DCP”

PROGRAMMER Function

- ASD equipped with programmer function to simplify the parameter configuration of ASD and give the simplest commissioning method and convenient for minor parameter changes requirement
- Parameter function include “Alarm Threshold”, “Air Flow Monitoring”, “Date and Time”, “Filter”, “Relay”, “GPI”
- Equipped with password code to prevent unauthorized sabotages
- Without password code, user can see and know what is the parameter setting the current ASD is using from the front display

AVA PREVENT
Aspirating Cabinet Smoke Detection

AVA PREVENT
Aspirating Cabinet Smoke Detection

Product Comparison Chart

VESDA vs AVA ASD Model Comparison Chart

Features	VEU	VEP 4-Pipes	Quartas-2000s (1A)	VES	Quartas-2000s (4A)	VEP 1-pipe	Quartas-500s	VLF 250/500
Pipe Length	4 x 100m	4 x 70m	4 x 100m	4 x 70m	4 x 100m	1 x 100m	1 x 100m	1x25m/1x50m
Total Aggregate Length	800m	560m	960m	560m	960m	130m	240m	25/50m
Area Coverage	6,500m²	2,000m²	2,000m²	2,000m²	2,000m²	1,000m²	1,000m²	250m² /500m²
No. of pipe inlets	4	4	4	4	4	1	1	1
Pipe Addressability	No	No	No	Up to 4	Up to 4	No	No	No
Detection range	0.001~20% obs/m	0.005~20% obs/m	0.001~25% obs/m	0.005~20% obs/m	0.001~25% obs/m	0.005~20% obs/m	0.001~25% obs/m	0.025~20% obs/m
Alarm Level	4 Alarm Level		4 Alarm Level	4 Alarm Level	4 Alarm Level	4 Alarm Level	4 Alarm Level	4 Alarm Level
Pre-Alarm or Fire Level	Configurable from 0.001 to 20% obsc/m	Configurable from 0.005 to 20% obsc/m	Configuration range from Fire 1 of 0.01 to 20% obs/m	Configurable from 0.005 to 20% obsc/m	Configuration range from Fire 1 of 0.01 to 20% obs/m	Configurable from 0.005 to 20% obsc/m	Configuration range from Fire 1 of 0.01 to 20% obs/m	Configurable from 0.025 to 20% obsc/m
Max. no of Holes EN54-20 (Class A/B/C)	80/80/100	40/80/100	40/60/100	40/80/100	40/60/100	30/40/45	30/60/60	12/12/12 30/30/30
Aspirator	1	1	4	1	4	1	1	1
Air Flow Sensor	4	4	4	4	4	1	1	1

AVA PREVENT
Aspirating Cabinet Smoke Detection

VESDA vs AVA ASD Model Comparison Chart

Features	VEU	VEP 4-Pipes	Quartas-2000s (1A)	VES	Quartas-2000s (4A)	VEP 1-pipe	Quartas-500s	VLF 250/500
Display	LED or 3.5” Color Touch Screen	LED or 3.5” Color Touch Screen	3 in 1 Front Panel Control/Display/ Programmer	LED or 3.5” Color Touch Screen	3 in 1 Front Panel Control/Display/ Programmer	LEDs	3 in 1 Front Panel Control/Display/ Programmer	LEDs
LED Status	Alert, Action, Fire 1, Fire 2, Disable, Fault, Power		Alert, Action, Fire 1, Fire 2, System, Flow, Detector, Isolate, OK, Aux	Alert, Action, Fire 1, Fire 2, Disable, Fault, Power	Alert, Action, Fire 1, Fire 2, System, Flow, Detector, Isolate, OK, Aux	Alert, Action, Fire 1, Fire 2, Disable, Fault, Power	Alert, Action, Fire 1, Fire 2, System, Flow, Detector, Isolate, OK, Aux	Alert, Action, Fire 1, Fire 2, Disable, Fault, Power
Smoke Segment	With 3.5” Color Touch Screen Type		20	With 3.5” Color Touch Screen Type	20	NO	20	10
Numerical Display	With 3.5” Color Touch Screen Type		Real Time Smoke Real Time Air Flow Active Event	With 3.5” Color Touch Screen Type	Real Time Smoke Real Time Air Flow Active Event	No	Real Time Smoke Real Time Air Flow Active Event	No
Control Button	Acknowledge, Reset, Disable	Acknowledge, Reset, Disable	Reset, Silence, Test, Isolate	Acknowledge, Reset, Disable	Reset, Silence, Test, Isolate	Acknowledge, Reset, Disable	Reset, Silence, Test, Isolate	Acknowledge, Reset, Disable m
Programming tool	PC via USB		Front Panel or PC via RS-485	PC via USB	Front Panel or PC via RS-485	PC via USB	Front Panel or PC via RS-485	PC via USB
Relay / GPI Input	7 /2	7 /2	7 /8	17 /2	23 /8	7 /2	7 /4	3 /1
Networking	RS-485		RS-485	RS-485	RS-485	RS-485	RS-485	RS-485
Modbus RTU	Only via HLI		Yes build in each ASD	Only via HLI	Yes build in each ASD	Only via HLI	Yes build in each ASD	Only via HLI
Event Memory	20,000	20,000	183,000	20,000	20,000	20,000	183,000	18,000

AVA PREVENT
Aspirating Cabinet Smoke Detection

SECURITON vs AVA ASD Model Comparison Chart

Features	ASD 535-4	ASD 535-3	Quartas-2000s (1A)	ASD 533	Quartas-2000s (4A)	ASD 532	Quartas-500s	ASD 531
Pipe Length	2 x 110m	1 x 110m	4 x 100m	1 x 80m	4 x 100m	1 x 70m	1 x 100m	1 x 40m
Branch Length	2 x 300m	1 x 300m	960m	200m	960m	120m	240m	75m
Area Coverage	5,760m²	2,880m²	2,000m²	1920m²	2,000m²	1,280m²	1,000m²	720m²
No. of pipe inlets	2	1	4	1	4	1	1	1
Pipe Addressability	No	No	No	No	Up to 4	No	No	No
Detection range	0.002~10% obs/m	0.002~10% obs/m	0.001~25% obs/m	0.002~10% obs/m	0.001~25% obs/m	0.005~10% obs/m	0.001~25% obs/m	0.006~10% obs/m
Max. no of Holes EN54-20 (Class A/B/C)	36/112/240	18/56/120	40/60/100	16/50/50	40/60/100	8/12/16	30/60/60	6/8/12
Aspirator	1	1	4	1	4	1	1	1
Air Flow Sensor	2	1	4	1	4	1	1	1
Dust Filter	Optional	Optional	Built in	Optional	Built in	Optional	Built in	Optional

AVA PREVENT
Aspirating Cabinet Smoke Detection

SECURITON vs AVA ASD Model Comparison Chart

Features	ASD 535-4	ASD 535-3	Quartas-2000s (1A)	ASD 533	Quartas-2000s (4A)	ASD 532	Quartas-500s	ASD 531
Display	LED Only	LED Only	3 in 1 Front Panel Control/Display/ Programmer	LED Only	3 in 1 Front Panel Control/Display/ Programmer	LED Only	3 in 1 Front Panel Control/Display/ Programmer	LED Only
LED Status	Alarm, Fault, Det. Dusty, OK	Alarm, Fault, Det. Dusty, OK	Alert, Action, Fire 1, Fire 2, System, Flow, Detector, Isolate, OK, Aux	Alarm, Fault, Det. Dusty, OK	Alert, Action, Fire 1, Fire 2, System, Flow, Detector, Isolate, OK, Aux	Alarm, Fault, Det. Dusty, OK	Alert, Action, Fire 1, Fire 2, System, Flow, Detector, Isolate, OK, Aux	Alarm, Fault, Det. Dusty, OK
Smoke Segment	2 x 10 Smoke	10 Smoke	20	Nil	20	10 Smoke	20	Nil
Numerical Display	Nil	Nil	Real Time Smoke Real Time Air Flow Active Event	Nil	Real Time Smoke Real Time Air Flow Active Event	Nil	Real Time Smoke Real Time Air Flow Active Event	Nil
Control Button	Reset	Reset	Reset, Silence, Test, Isolate	Reset	Reset, Silence, Test, Isolate	Reset	Reset, Silence, Test, Isolate	Reset
Programming tool	USB via PC	USB via PC	Front Panel (No need PC)	USB via PC	Front Panel (No need PC)	Ethernet	Front Panel (No need PC)	Rotary Switch
Relay / GPI Input	3 / 1	3 / 1	7 / 8	3 / 1	23 / 8	2 / 1	7 / 4	2 / 1
Optional Relay	5	5		5		5		Nil
Networking Module	Optional with SIM-35	Optional with SIM-35	RS-485 with repeater	Nil	RS-485 with repeater	Optional with SIM-35	RS-485 with repeater	Nil
Modbus RTU	Optional with NCU-900	Optional with NCU-900	Yes	Nil	Yes	Optional with NCU-900	Yes	Bil

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PROTEC vs AVA ASD Model Comparison Chart

Features	ProPoint 1	ProPoint 2	ProPoint 3	ProPoint 4	Quartas-500s	Quartas-2000s (1A)	Quartas-2000s (4A)
Total Aggregate Length	50m???	100m???	150m???	200m?	240m	960m	960m
Area Coverage	800m²	1600m²	2400m²	3200m² ??	1,000m²	2,000m²	2,000m²
No. of pipe inlets	1	2	3	4	1	4	4
Pipe Addressability	No	Up to 2	Up to 3	Up to 4	No	No	Up to 4
Detection range	0.12 to 11% obs/m				0.001~25% obs/m		
Alarm Level	2				4 Alarm Level		
Pre-Alarm or Fire Level	Pre-Alarm estimate at 2.2% obs/m Fire estimate at 2.9% obs/m for Class A and 3.6% for Class B & C				Configuration range from Fire 1 of 0.01 to 20% obs/m		
Max. no of Holes EN54-20 (Class A/B/C)	3/5/12	6/10/24	9/15/36	12/20/48	30/60/60	40/60/100	40/60/100
Aspirator	1	1	1	1	1	4	4
Air Flow Sensor	1	2	3	4	1	4	4

PROTEC vs AVA ASD Model Comparison Chart

Features	ProPoint Plus 1	ProPoint Plus2	ProPoint Plus 3	ProPoint Plus 4	Quartas-500s	Quartas-2000s (1A)	Quartas-2000s (4A)
Display	OLED Display				3 in 1 Front Panel Control/Display/ Programmer		
LED Status	Pre-alarm warning, Fire, OK, Fault				Alert, Action, Fire 1, Fire 2, System, Flow, Detector, Isolate, OK, Aux		
Smoke Segment	Not available				20 smoke segment		
Numerical Display	Yes after enter access code and scroll through menu * Only for Optical and CO value.				Real Time Smoke Real Time Air Flow Active Event		
Control Button	Via front menu				Reset, Silence, Test, Isolate		
Programming tool	Front Panel or PC via USB or TCP/IP				Front Panel or PC via RS-485		
Relay / GPI Input	5 / 3				7 / 4	7 / 8	23 / 8
Networking Module	RS-485				RS-485 with repeater		
Modbus RTU	???				Yes build in each ASD		
Event Memory	24000 Event				183,000 include event and analogue value for smoke and air flow		

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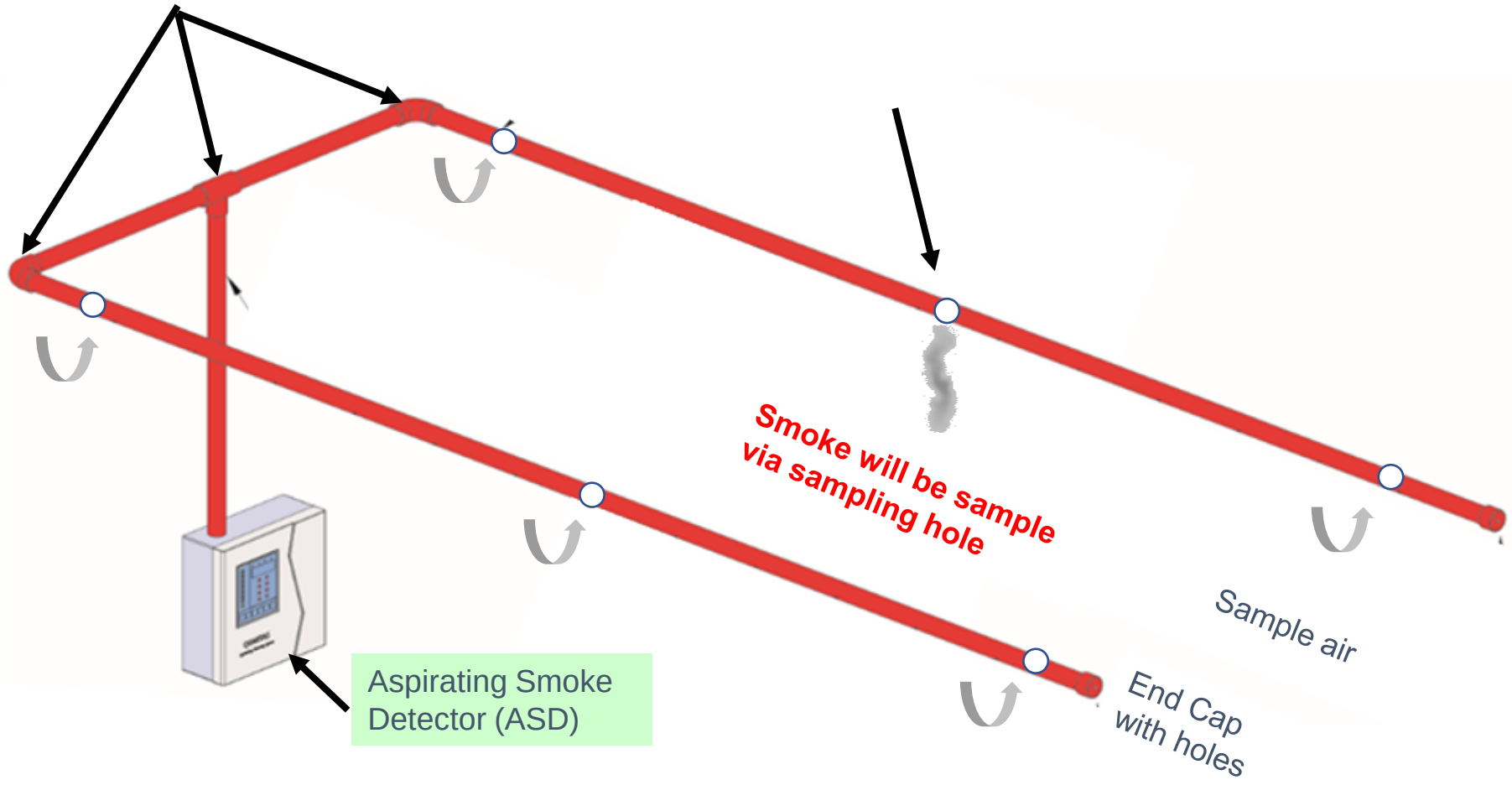
Design

Consideration Factor

Sample tube network Layout



Product Approval Standard and Code of Practice

PRODUCT APPROVAL STANDARD

- EN54-20 Fire detection and fire alarm systems. Aspirating smoke detectors
- FM 3230: Approval Standard for Smoke Actuated Detectors for Automatic Alarm Signalling
- UL 268: Smoke Detectors for Fire Alarm Signalling Systems
- GB15631: Special Type Fire Detector
- Korea KFI
- Australia

CODE OF PRATICE

- US Code
  - NFPA 72 National Fire Alarm and Signalling Code
  - NFPA 75 Standard for Fire Protection of Information Technology Equipment
  - NFPA 76 Standard for Fire Protection of Telecommunication Facilities
  - NFPA 318 Standard for Fire Protection of Semiconductor Fabrication Facilities
- European
  - FIA 2012 Code of Practice for Design, Installation, Commissioning & Maintenance of Aspirating Smoke Detector

Sensitivity Requirement & Transport Time Requirement

ASD CATEGORY	SENSITIVITY REQUIREMENT	MAXIMUM TRANSPORT TIME	Recommendation
Very Early Warning System (VEWFD)	3.30% Obsc/m	60 Seconds	NFPA
Early Warning System (EWFD)	4.95% Obsc/m	90 Seconds	NFPA
Standard Fire Detector (SFD)		120 Seconds	NFPA

SENSITIVITY CLASS	SENSITIVITY REQUIREMENT	MAXIMUM TRANSPORT TIME	Recommendation
CLASS A – Very High Sensitivity	< 0.05dB/m ~ (1.14% obsc/m) End of Test Condition	60 Seconds	EN54-20/FIA
CLASS B – Enhanced Sensitivity	< 0.15dB/m ~(3.39% obsc/m) E nd of Test Condition	90 Seconds	EN54-20/FIA
CLASS C – Normal Sensitivity	< 2dB/m% ~(45% obsc/m) End of Test Condition	120 Seconds	EN54-20/FIA

ASD Design Consideration

Detection Zone

- A single aspirating detector should cover area not exceeding a maximum area of a detection zone (nominally 2000m^2 BS 5839-1).
- Failure of any single aspirator/fan or other critical component within an ASD system should not remove protection from an area greater than one detection zone i.e. 2000m^2.
- when monitoring supply and extract ducts, should be confined to the definition of a detection zone.

Multi-Channel detectors

- Can be multi-detectors or pipes with scanning operation
- Important factors
  - The first alarm is declared within the times allowed in the type testing Standards
  - After the signalling of the first alarm, no pipe/channel is left un-sampled for a period greater than 3 minutes
  - That all areas protected are sub-zones within a single detection zone

Networking Connection to Fire Alarm Panel shall follow Fire Alarm Communication Requirement

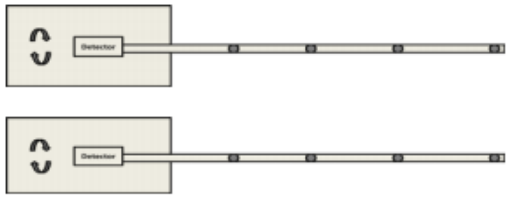
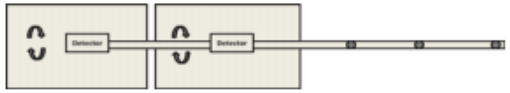
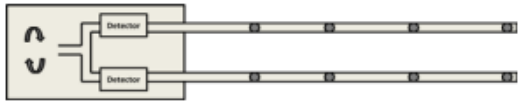
- One communication Failure shall not affect area more than 2,000m^2
- Two communication Failure shall not affect area more than 10,000m^2

ASD Design Consideration

Co-Incidence Detection Method / The double-knot will be from either

1) Two Point Detectors OR 2) Two Different Technologies OR
3) Two Circuits OR 4) Two Zones

Table 4 – Redundancy and Coincidence Solutions using ASD

Description	Figure	Advantages	Disadvantages	Example
Scheme A Two ASD systems protect the same area with independent aspirator, detector and pipe networks		All system components are duplicated: redundancy. Coincidence from independent detector and sampling pipe systems	More equipment required: expensive	Critical Category Risks such as Internet Hosting Centres or Nuclear/Biological Control Rooms
Scheme B Two ASD's protect the same area with independent aspirator, detectors and a shared pipe network		ASD are duplicated: redundancy (excluding shared pipe work). Coincidence from independent detectors.	Shared sampling pipe network	High Category Risks such as Main IT Facilities or Telecommunications Areas
Scheme C A single ASD with two detectors protects the risk with a shared pipe network and shared aspirator		Detector modules are duplicated: redundancy	Shared pipe work and aspirator fan	Medium Category Risks such as Call Centres
Scheme D A single ASD with two detectors protects the risk with separate pipe networks		Coincidence from independent sampling pipe networks and detector modules	Shared aspirator fan	Medium Category Risks such as Call Centres

ASD Design Consideration

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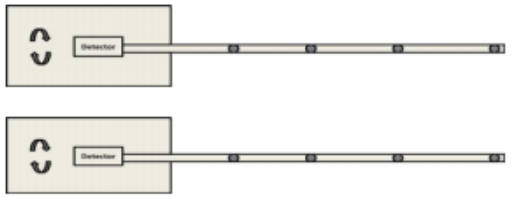
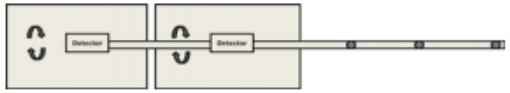
Scheme A Two ASD systems protect the same area with independent aspirator, detector and pipe networks		All system components are duplicated: redundancy. Coincidence from independent detector and sampling pipe systems	More equipment required: expensive	Critical Category Risks such as Internet Hosting Centres or Nuclear/Biological Control Rooms
Scheme B Two ASD's protect the same area with independent aspirator, detectors and a shared pipe network		ASD are duplicated: redundancy (excluding shared pipe work). Coincidence from independent detectors.	Shared sampling pipe network	High Category Risks such as Main IT Facilities or Telecommunications Areas
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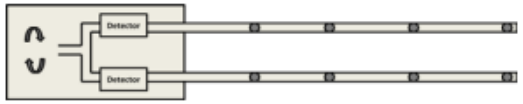
Scheme D A single ASD with two detectors protects the risk with separate pipe networks		Coincidence from independent sampling pipe networks and detector modules	Shared aspirator fan	Medium Category Risks such as Call Centres

Quartas Series ASD Technical Capability

Quartas-500s

Coverage Area

- 1000 Sq Meter *FM Approved
- 1300-1500 Sq Meter *Non Compliance but technically feasible

Sampling Hole Quantity

- EN54-20 Class A : 40 holes
- EN54-20 Class B : 60 holes
- EN54-20 Class C : 60 holes

Sampling Tube Length

- Single pipe length linear : 100m
- Total Branches : 240m

Quartas-2000s

Coverage Area

- 2000 Sq Meter *FM Approved
- 2500-3000 Sq Meter *Non Compliance but technically feasible

Sampling Hole Quantity

- EN54-20 Class A : 40 holes
- EN54-20 Class B : 60 holes
- EN54-20 Class C : 100 holes

Sampling Tube Length

- Single pipe length linear : 4 x 100m
- Total Branches : 4 x 240m = 960m

ASD Design Consideration

PRIMARY SAMPLING

- Pipe is located at Return Air Grill / Dry Coil
- NFPA 75 / 76 / 318
- FIA Code with EN54-20 Class A Sensitivity

SECONDARY SAMPLING

- Pipe is located at Ceiling Level or Raised Floor
- Similar to Spot Detector design regulation
- Max Transport Time is 120 sec
- NFPA 72 / FIA Code

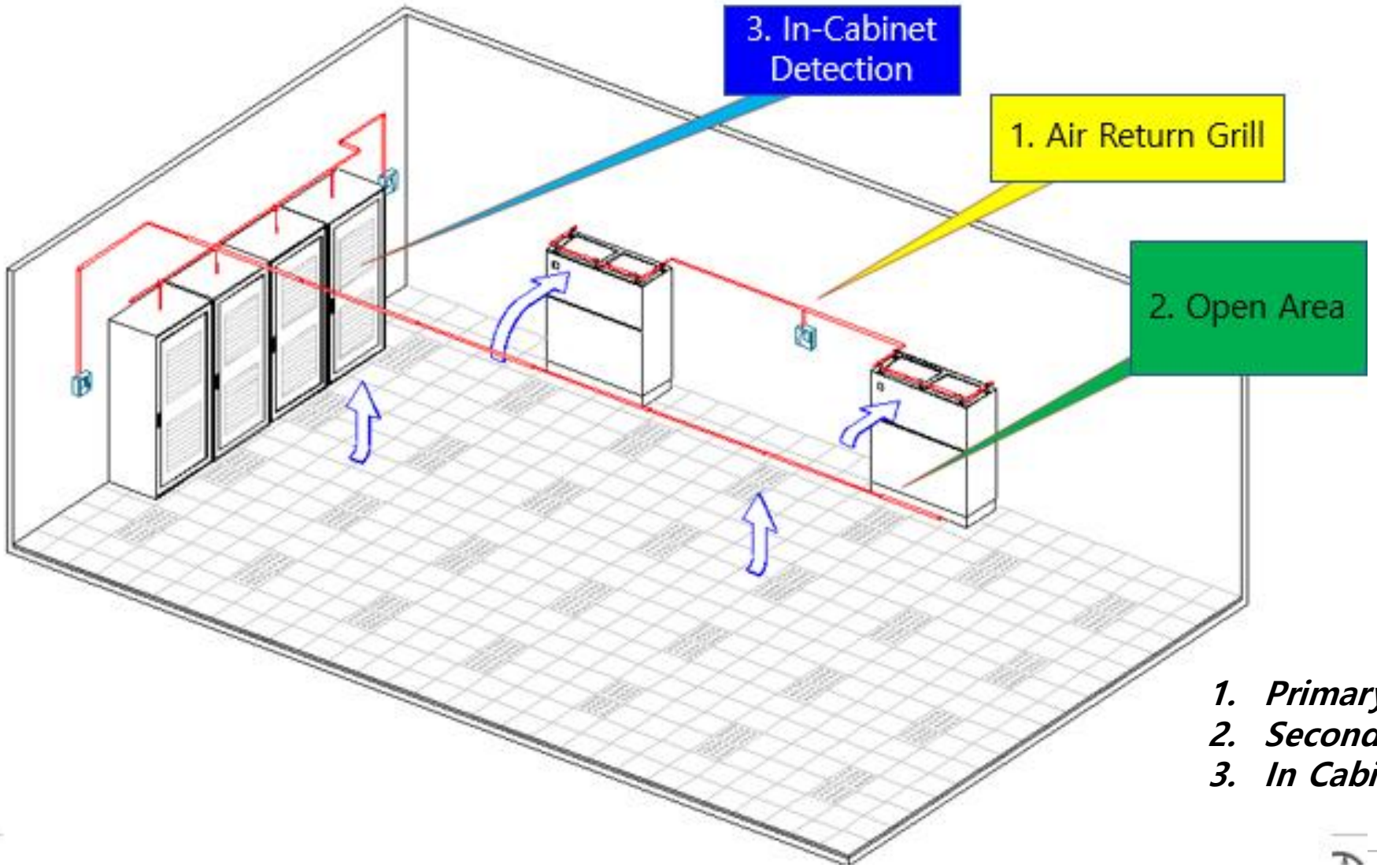
IN CABINET SAMPLING

- Mainly for cabinet detection
- Recommend to individually know the which cabinet has smoke
- Follow FIA Code recommendation

HIGH STORAGE RACK

- Pipe is located at Storage Rack
- Multi-Level Rack along the storage Rack
- Follow FIA Code recommendation

Overview of Different Sampling Tube Method



1. ***Primary Sampling (Air Return Grill)***
2. ***Secondary Sampling (Open Area)***
3. ***In Cabinet Sampling***

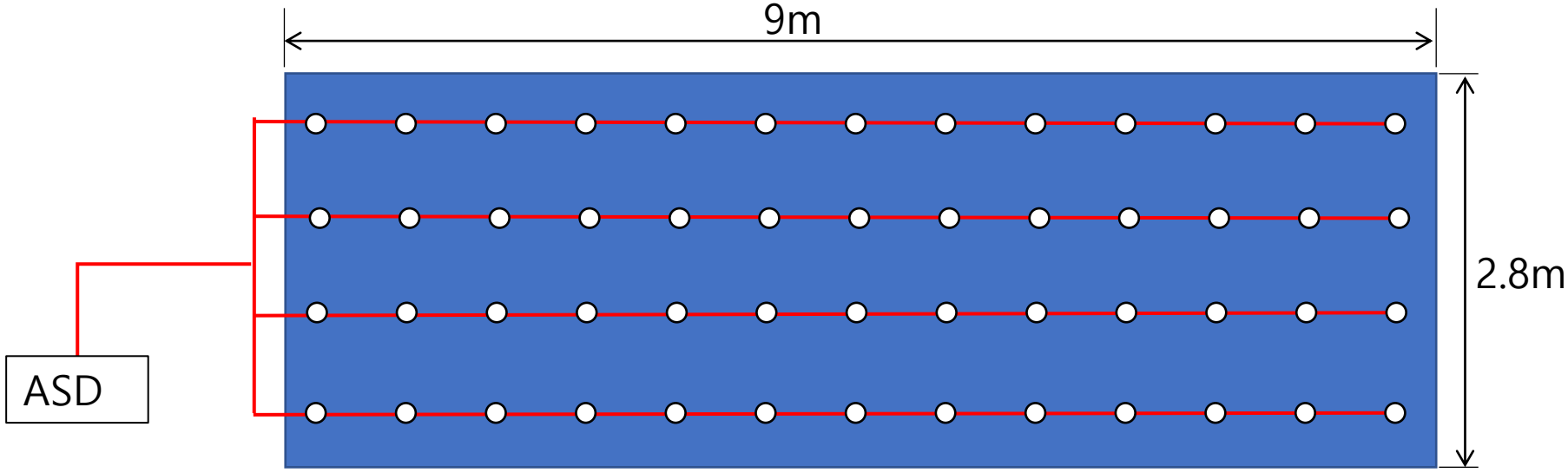
Primary Sampling Design

Recommend Guideline for ASD Design for High Air Flow Application

- Air Return Grill should have enough sampling hole for coverage
- Recommend sampling hole coverage area to be maximum ***0.4m²***
- When large airflows into the grill are encounter (typically >4m/s, special arrangements may be necessary to position the pipe away from the grille using stand-off brackets.
- Sampling pipe shall be positioned in the main air stream and sampling hole normally have a angle of ***30~60°*** off center, into the air flow
- AHU Maintenance work shall not be affected by the sampling tube network, if necessary sampling tube design / installation shall be able to remove easily. Consider using sampling UNION Fitting for convenient removal.
- Sampling tube and hole normally shall be located ***BEFORE*** the air filter
  - To prevent high Negative pressure
  - To prevent smoke particle being filter out by the filter

Primary Sampling Design / Dry Coil

- As according to NFPA 75/76/318 and FIA - Each sampling hole is suggested to monitor around 0.4 m^2
- One unit of Quartas 2000s will be required to protect around 40-60 sqm of Dry Coil

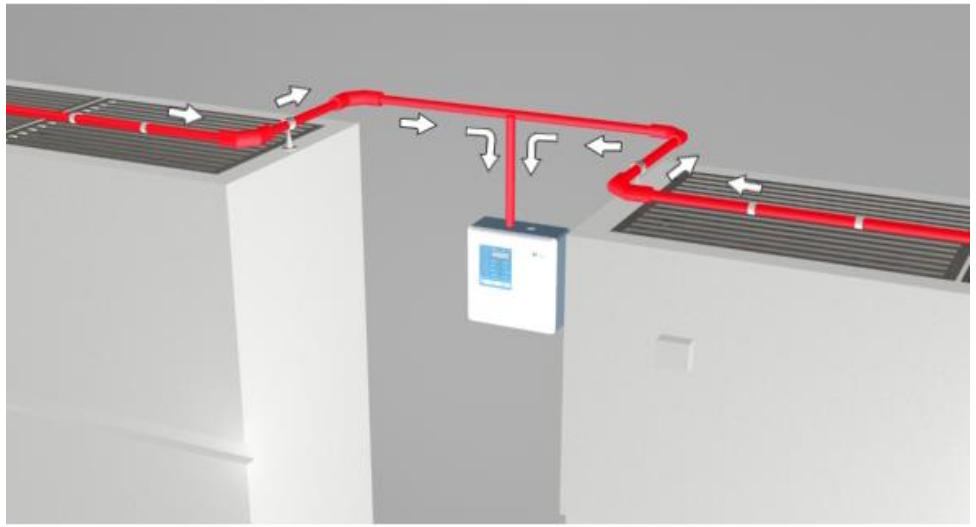


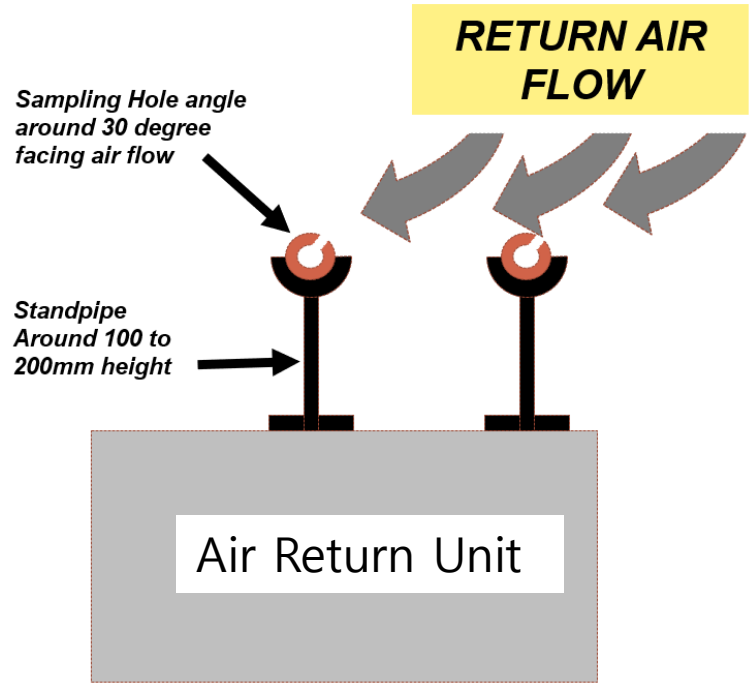
- Sampling Hole : Each Pipe consists of 13 holes. 4 pipe is 52 sampling holes
- Sampling Hole Distance

Coverage Area	Radius of coverage (R)	Point to Point Distance (D)	P = 3.142
0.4m^2	R = √ (0.4 ÷ p) R = 350mm	D = 2 x R (350mm) D = 700mm (Max)	

Primary Sampling Design / Air Return Unit

- As according to NFPA 75/76 - Each sampling hole is suggested to monitor around 0.4 sqm

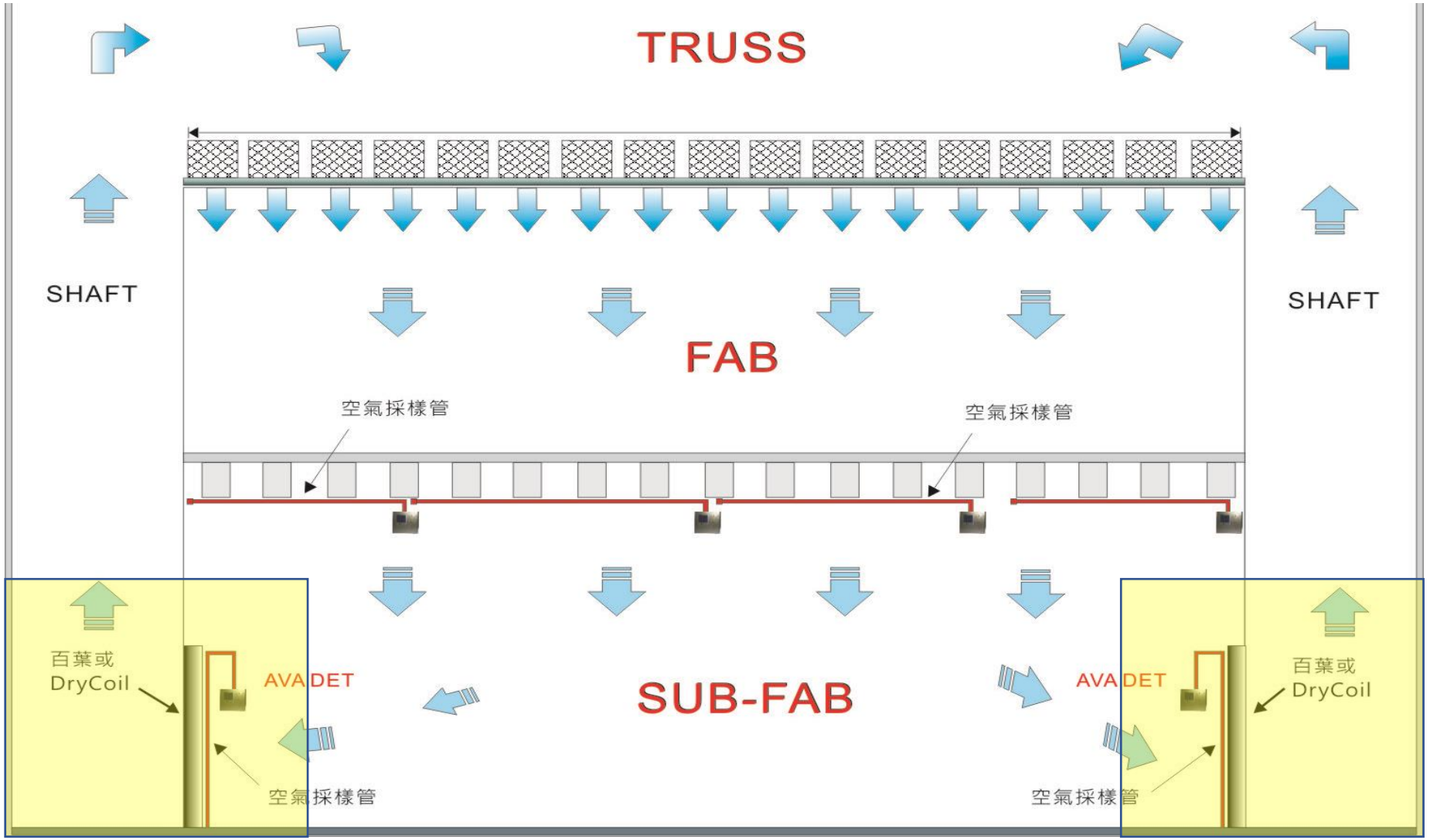




Coverage Area	Radius of coverage (R)	Point to Point Distance (D)	P = 3.142
$0.4m^2$	R = √ (0.4 ÷ p) R = 350mm	D = 2 x R (350mm) D = 700mm (Max)	

Primary Sampling Design / Installation Example

Primary Sampling Design / Installation Example



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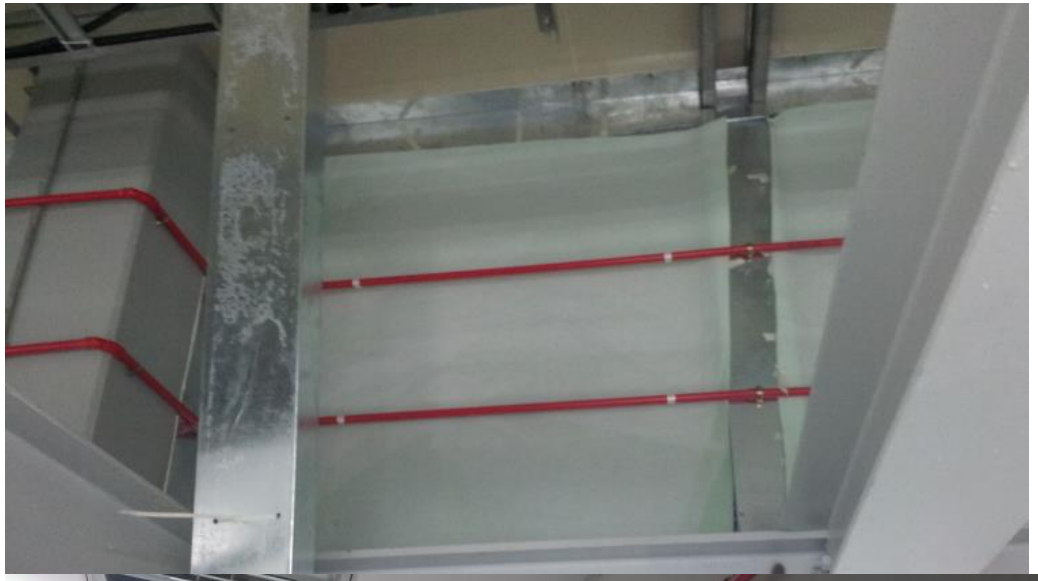
Primary Sampling Design / Installation Example

Primary Sampling Design / Installation Example



Secondary Sampling Design

MAXIMUM TRANSPORT TIME

- Consider the design pipe network layout n more effective method to reduce the transport time should not exceed 120 seconds
- Recommend to use Multiple Pipe even though single pipe will also work
- Single Pipe will have longer transport time compare to Multiple pipe
- Recommend to located ASD Detection Unit at the center of the pipe whenever it is possible
- Multiple Pipe will reduce the sampling air transport time to the ASD detection unit and will go through less bending

SINGLE PIPE

BRANCH

4 BRANCH

Secondary Sampling Design

BALANCE OF THE AIR SAMPLE

- It is a good design that sampling hole draw the sample amount of air entering the sampling tube to make a good balance system. It can achieve by either
  - Symmetric design of the sampling hole and sampling distance.
  - With the aid of the pipe flow tool to achieve a balance sampling design system with different sampling hole size.

RELATIVE SENSITIVITY

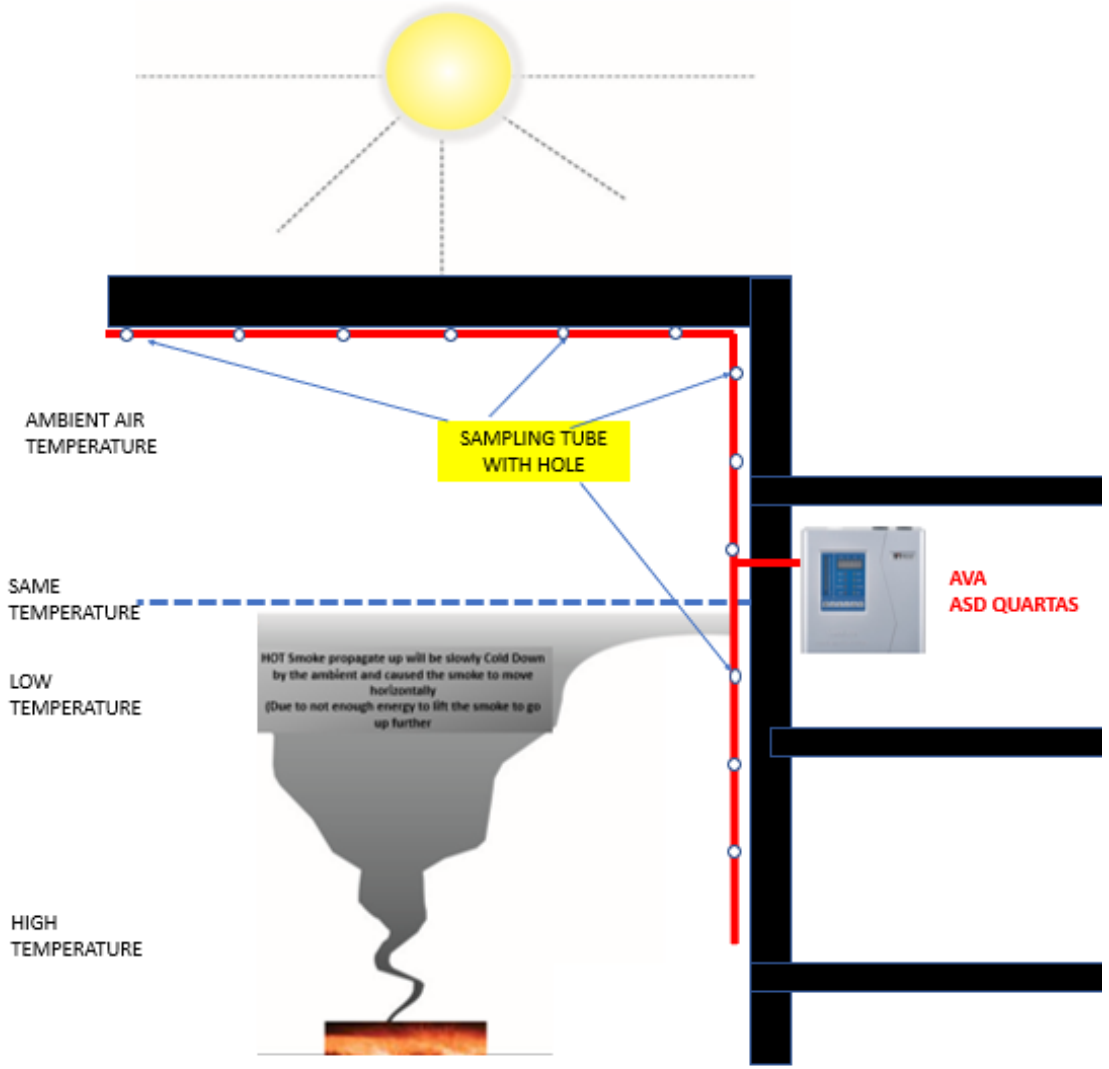
- The relative sensitivity of each sampling hole shall be better than 5% obsc/m for a class C system.
- For a simple quick assumption that all sampling hole achieve 100% balance. The relative sensitivity of each sampling hole can be calculated as below.
  - 0.1% % Alarm Threshold set to ASD with 40 sampling hole. This will equivalent to 4% obsc/m individual sampling hole sensitivity

Secondary Sampling Design

Stratification Application

- ❑At different high level
  - ❖ Apply Vertical Pipe
  - ❖ At different Level use Horizontal Pipe layout
  - ❖ Drop Down pipe or capillary from horizontal pipe layout

- ❑Vertical Pipe
  - ❖ Every 3 – 8m distance Or every 2°C
  - ❖ Sampling tube can follow the beam, air ventilation duct or other structure



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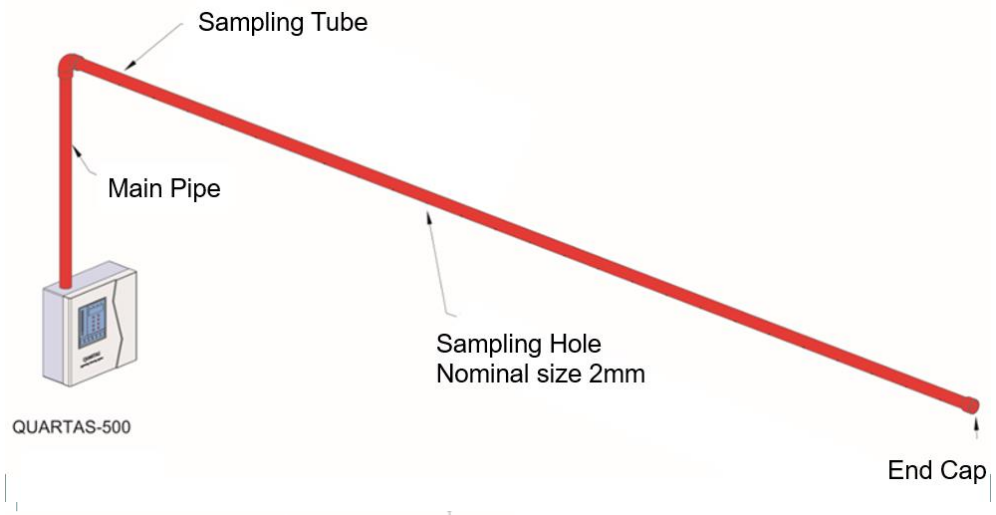
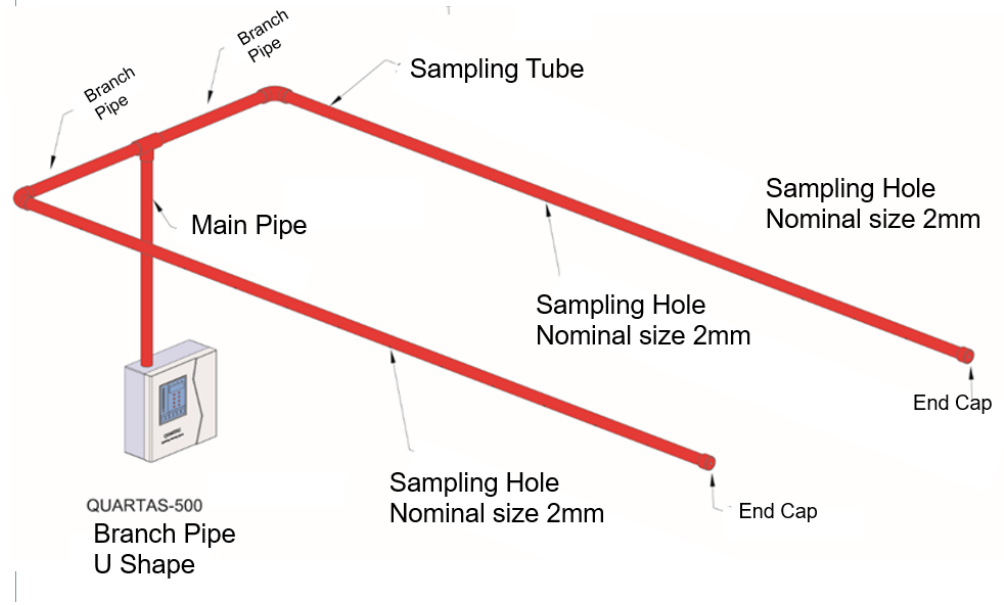
Secondary Sampling Design

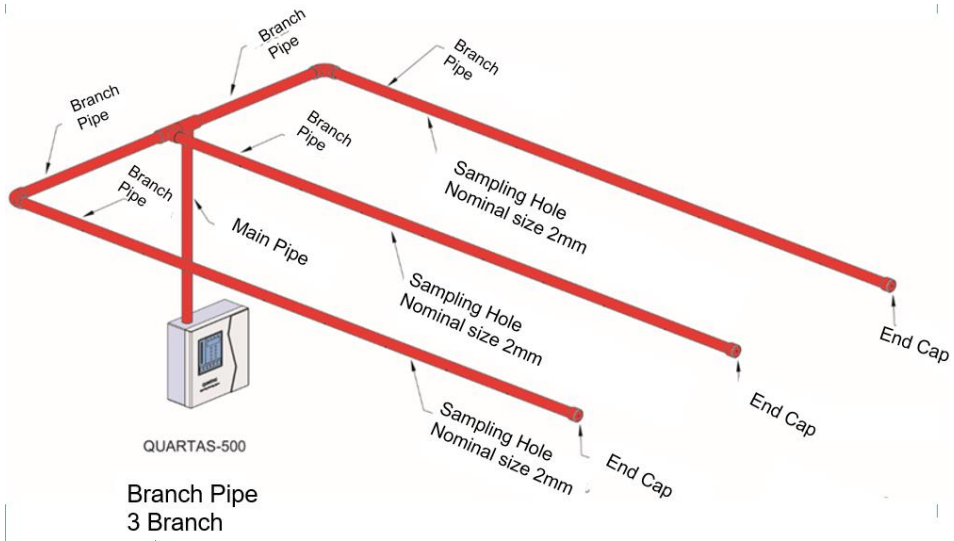


SINGLE BRANCH PIPE



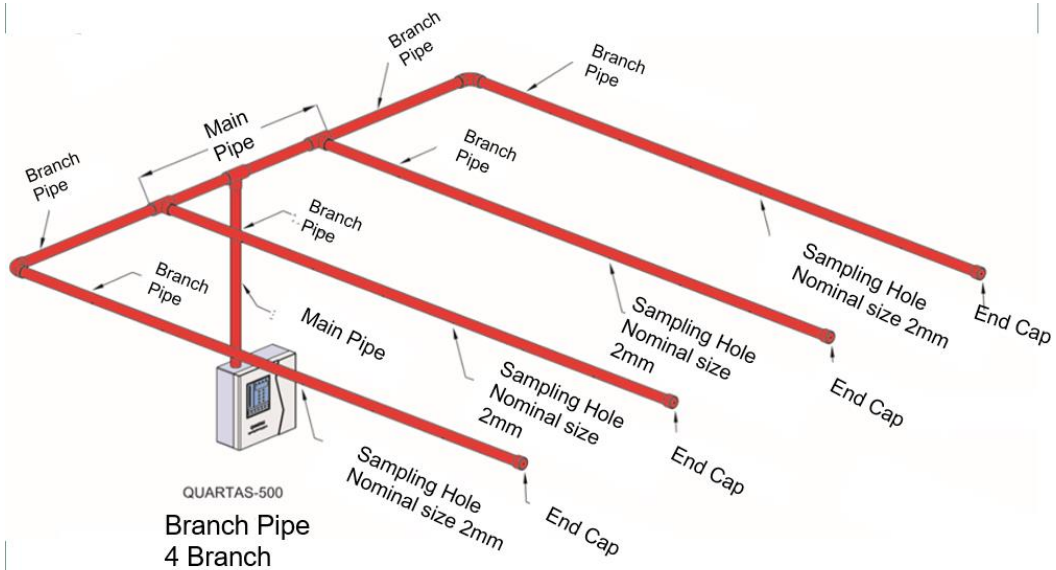
TWO BRANCH PIPES

Secondary Sampling Design



Branch Pipe
3 Branch

THREE BRANCH PIPES



Branch Pipe
4 Branch

FOUR BRANCH PIPES

Secondary Sampling Design

SAMPLING HOLE COVERAGE AREA GUIDELINE

As per Regulation from BS6266 –5.2.5.4

If air changes per hour is greater than 10, the maximum recommended coverage per smoke detector is 25 m^2.

If air changes per hour is less or equal than 10, the maximum recommended coverage per smoke detector is 40 m^2.

As per Regulation from NFPA 72

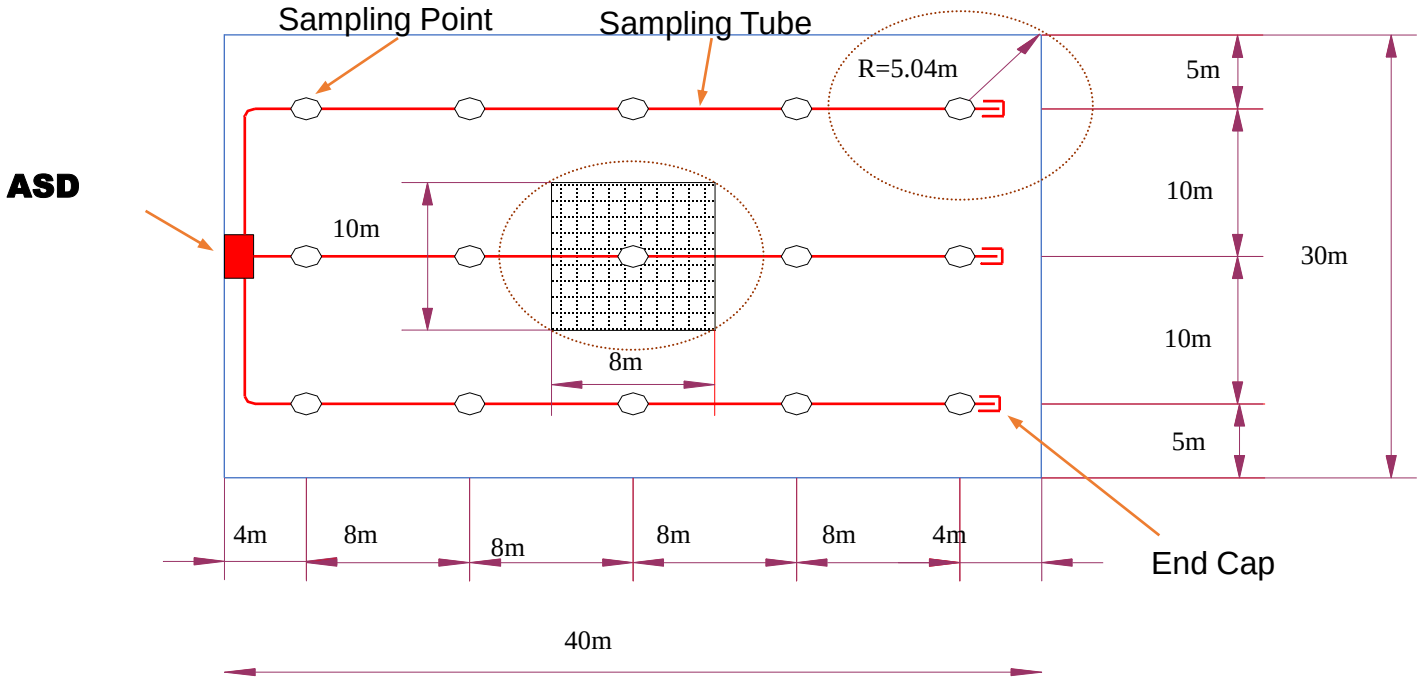
Air Change per hour	Sampling Hole Coverage m^2
60	12
30	23
20	35
15	46
12	58

Air Change per hour	Sampling Hole Coverage m^2
10	70
8.6	81
7.5	84
6.7	84
6	84

Secondary Sampling Design

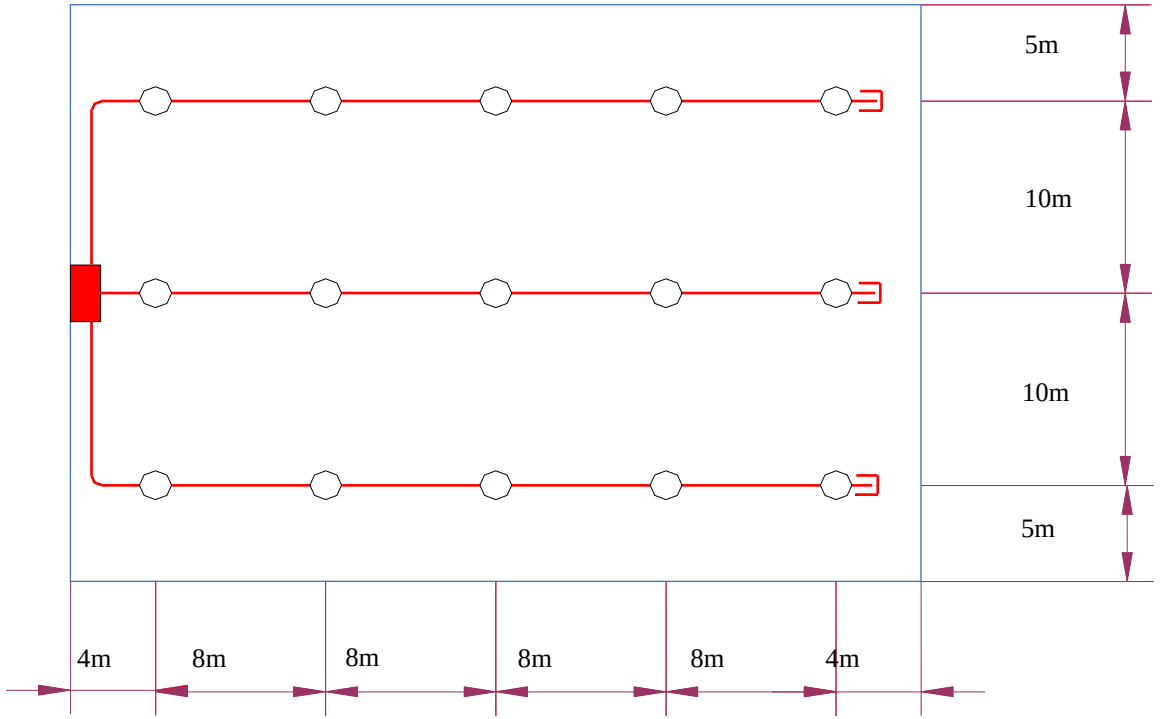
- Dimension is 30m x 40m x 8m (H)
- Room – Space Area = 1200m²
- Coverage Area ≤80m², Radius = 5.04m (Max)
- No of Sampling points = 1200 m² ÷ 80 = 15 sampling holes

No. of Sampling Points (lengthwise)	=	Dimensions of Room Walls / Point-to-Point Distance



Secondary Sampling Design

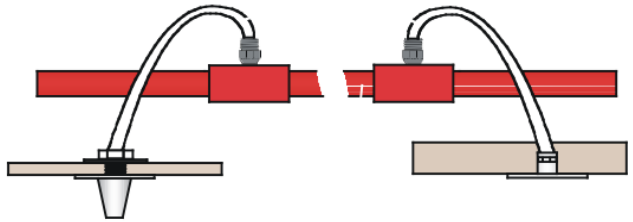
SAMPLING TUBE NETWORK PARAMETER



Inner Diameter Sampling Tube	21mm
Hole Diameter	2~4mm
End Cap Diameter	2~10mm
Total Pipe Length	6.5+10+4+8+8+8+8=52.5m
First Sampling Hole Location	6.5+10+4=20.5m
Sampling Hole Distance	8m

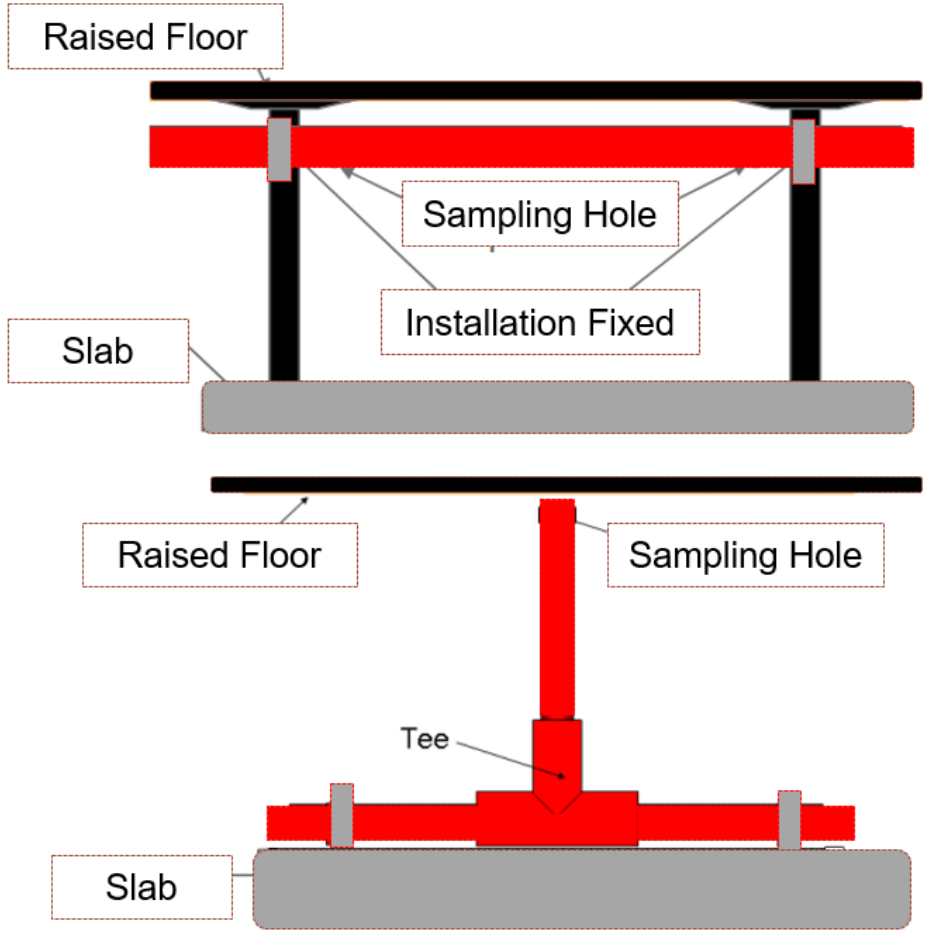
Secondary Sampling Design

Capillary Sampling Tube - False Ceiling

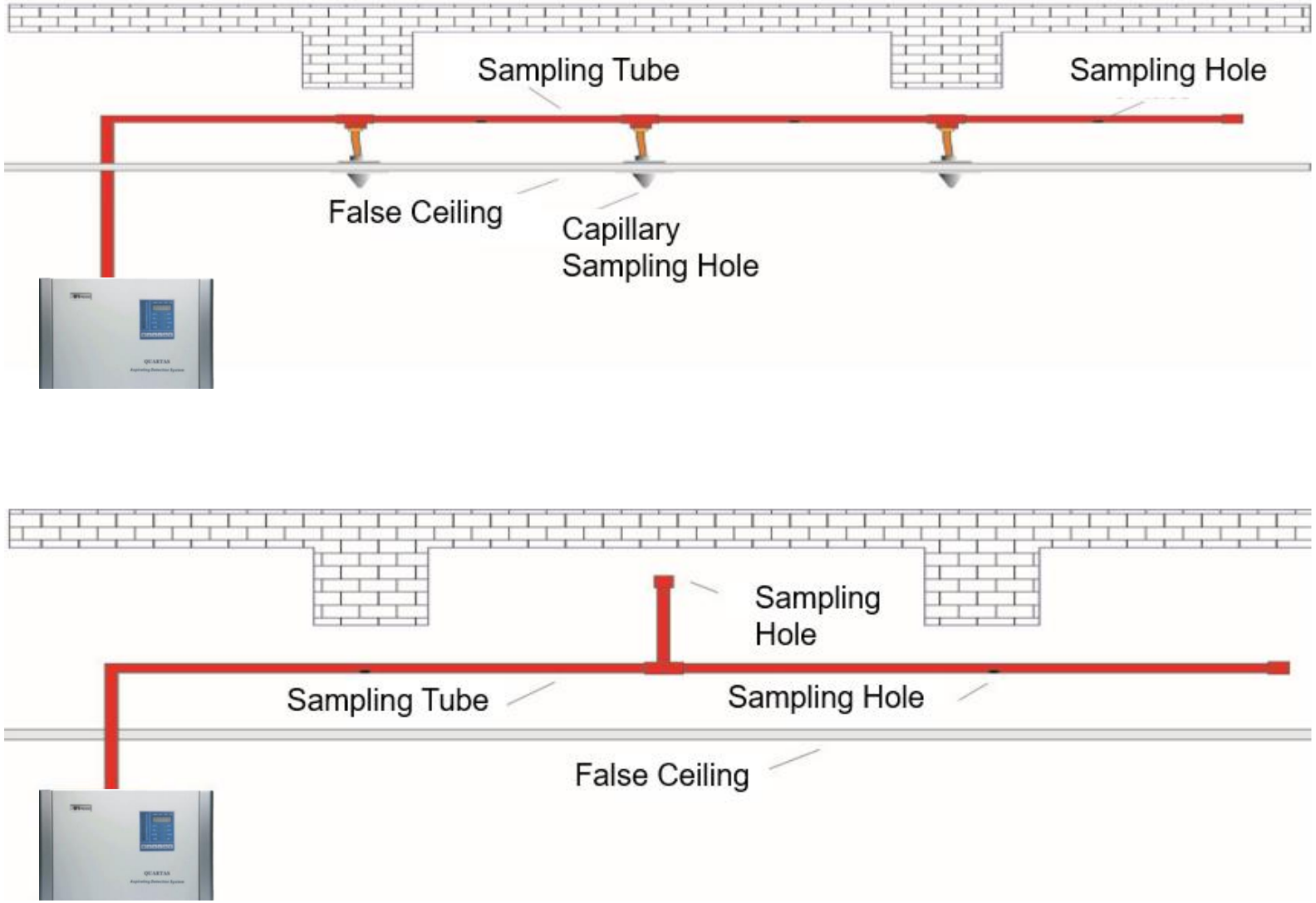


Direct Drilled Sampling Hole

Sampling Tube - Raised Floor



Secondary Sampling Design



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Secondary Sampling/ Installation Example

Secondary Sampling/ Installation Example

In Cabinet Sampling Design

General Design Guideline

- When cabinet is fully enclosed, internal sampling is required.
- When cabinet have ventilation outlet (Top or side or behind), recommend to have sampling hole shall be located at the ventilation outlet.
- Multiple sampling hole is required when the cabinet is large than 1200 x 600mm.
- Class A or Class B system shall be used when the ventilation rate such that dilution of the smoke is likely to caused normal sensitivity detector ineffective.
- Number of cabinet protected by Single ASD. This is in consideration to search and identify of the generated smoke from the cabinets.
  - For cabinet with class A system – Maximum 15 cabinet
  - For cabinet with class B system – Maximum 8 cabinet
  - For cabinet with class C system – Maximum 5 cabinet

***** This does not apply to CSD Design which is dedicated for each cabinet for Addressable Pin-Point Cabinet Purpose***

In Cabinet Sampling Design

Every cabinet have individual ASD – Pin Point each cabinet, No Smoke Dilution, Very Fast Detection because Short Distance to ASD

In Cabinet Detection / Installation Example

SAMPLING POINT ABOVE CABINET

ADDRESSABLE CABINET SMOKE DETECTOR

CAPILLARY INTO CABINET

SAMPLING POINT ABOVE CABINET

In Cabinet Detection / Installation Example

SAMPLING POINT ABOVE CABINET

ADDRESSABLE CABINET SMOKE DETECTOR

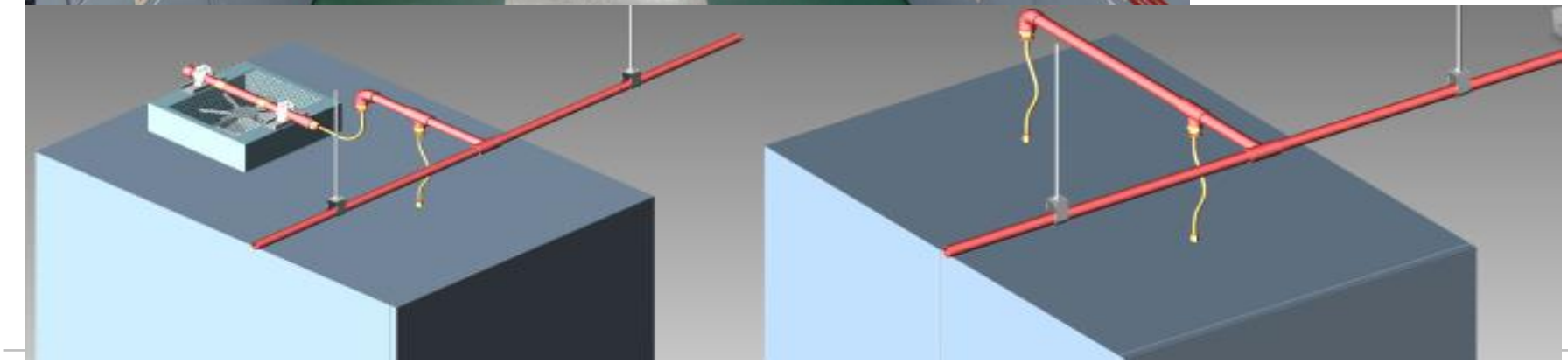
CAPILLARY INTO CABINET

SAMPLING POINT ABOVE CABINET

In Cabinet Detection/ Installation Example

In Cabinet Detection/ Installation Example

CABINET
SMOKE DETECT
OR



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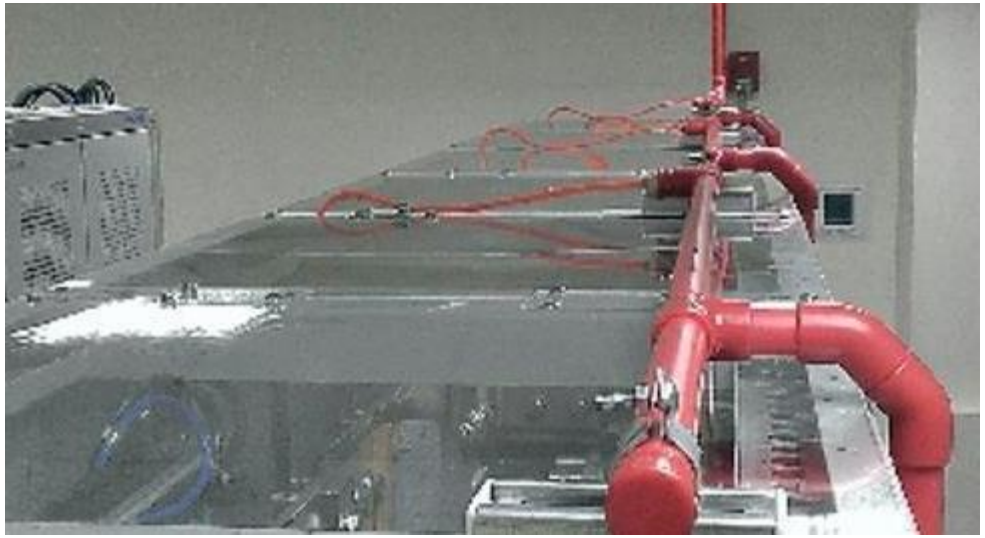
In Cabinet Detection/ Installation Example

RETURN AIR CRAC

CABINET AIR RETURN

In Cabinet Detection/ Installation Example



In Cabinet Detection/ Installation Example

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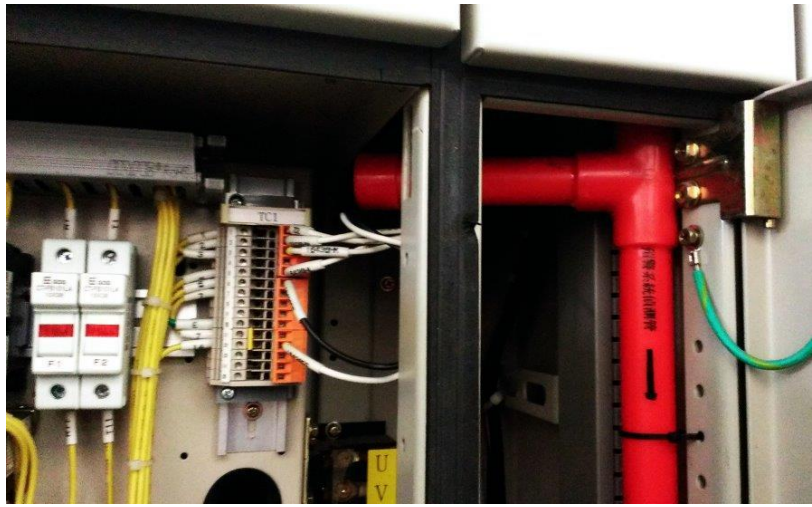
Aspirating Cabinet Smoke Detection

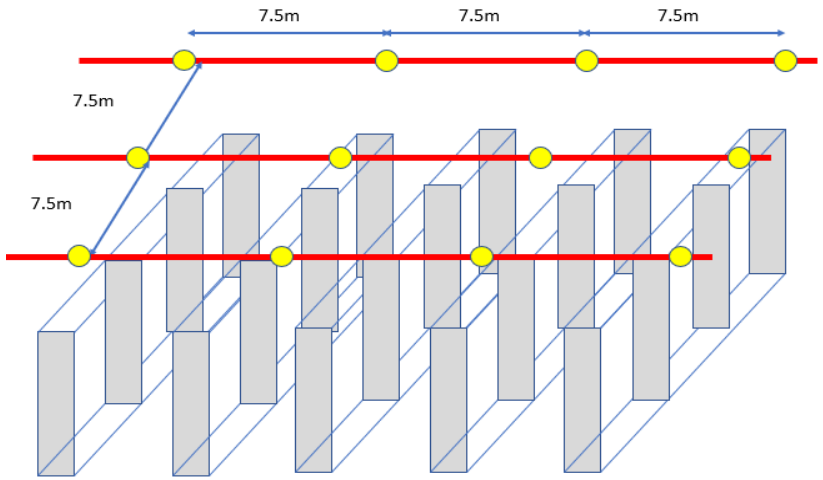
In Cabinet Detection/ Installation Example



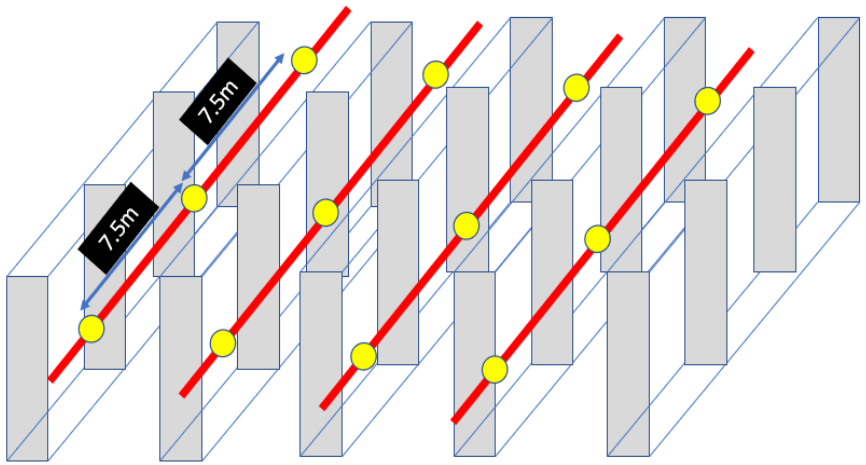
Warehouse Design

CEILING DETECTION Design Recommendation

- ASD Class B System is recommended
- Maximum 7.5m sampling hole spacing ***(Recommendation for better ASD Response time)***
- Sampling point positioned above the aisles wherever possible, particularly where rack height is >90% of t he ceiling height
- Installation Example as below



Sampling Pipe Across the Rack



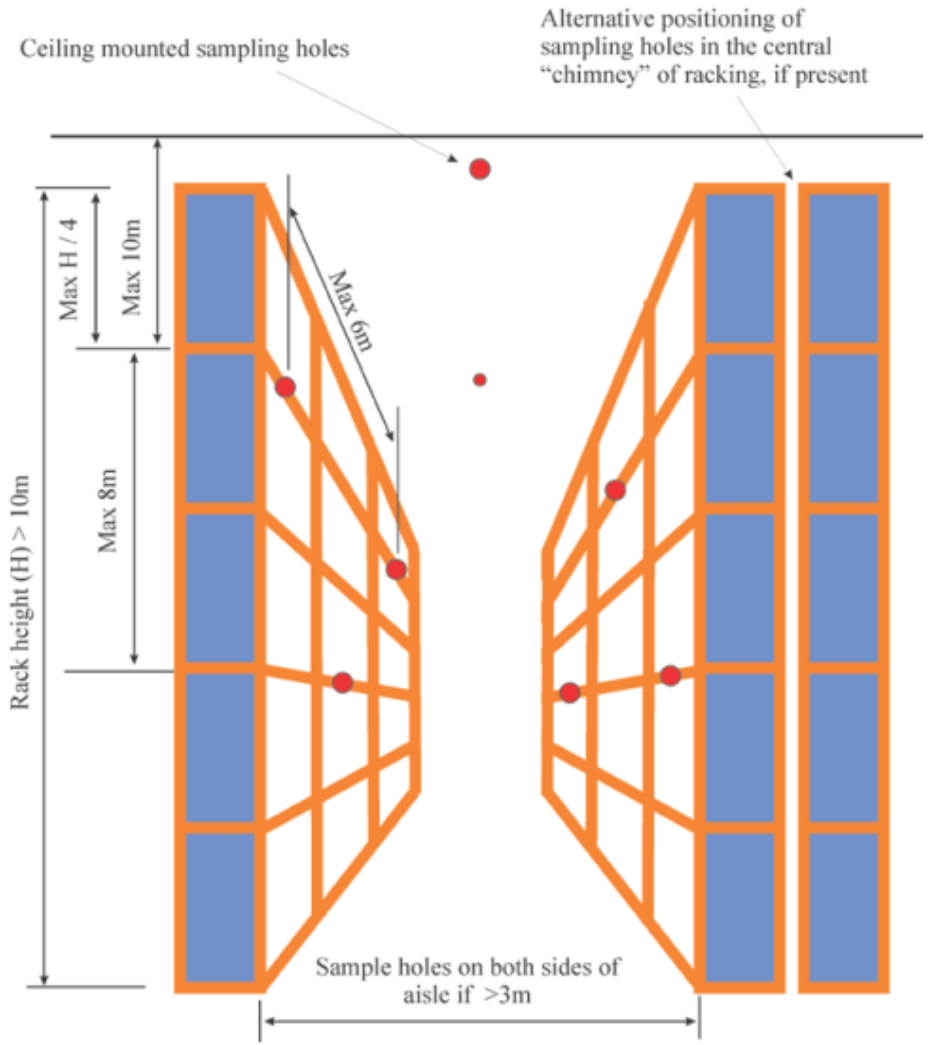
Sampling Pipe Along the Rack

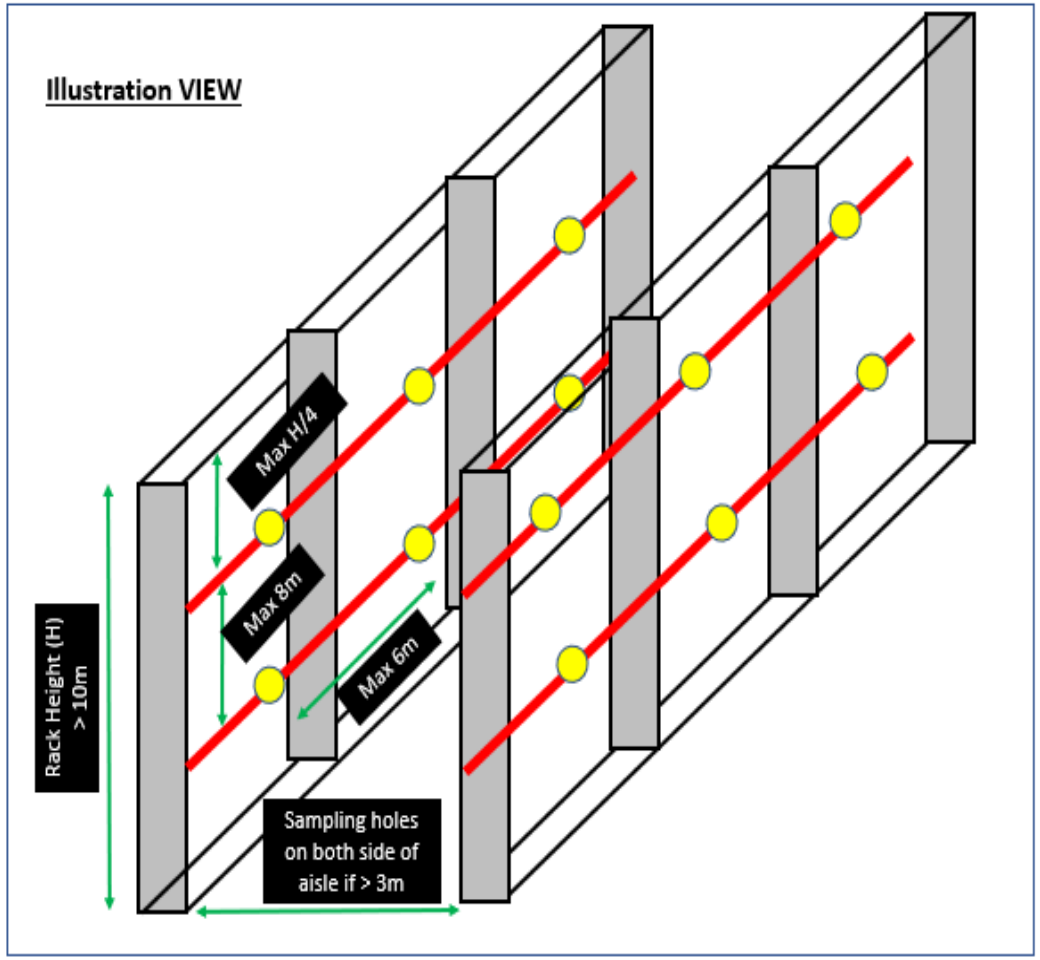
Warehouse Design

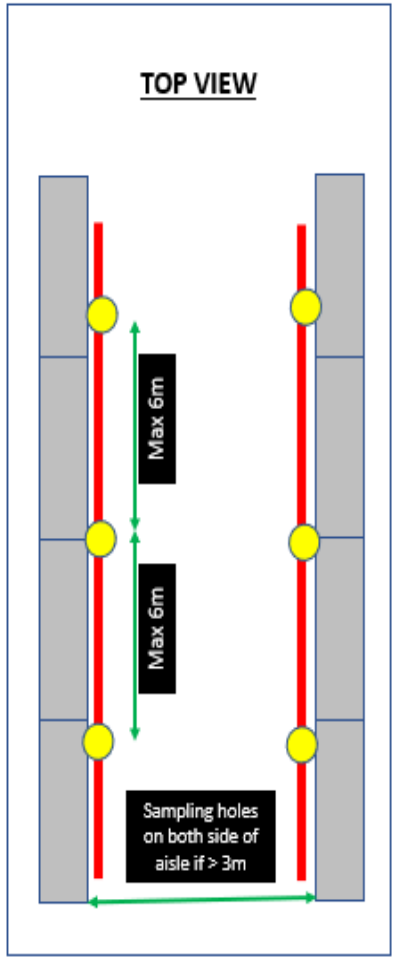
MULTILEVEL SAMPLING PIPE IN-RACK DETECTION Design Recommendation

- Where rack height exceeded above 10m, in rack sampling shall be provided
- A maximum horizontal spacing of 6m is recommended.
- Multilevel of the sampling tube is recommended with below recommendation
  - 1 Level of sampling tube : between 6 – 8m height from floor level
  - > 1 Level of sampling tube : each vertical level shall not more than 8m
    - Example Rack of 24m, recommend to have 3 level of sampling tube.
- Sampling tube position is recommended from below 2 options
  - Option 1 :- The sampling tube network is install between back-to-back shelving
  - Option 2 :- The sampling tube network is install at the shelving edge, adjacent to the aisles
  - We recommend option 2 whenever is possible as it provide more reliable and faster detection(Close the ignition source), and easier for install and testing.
  - If aisle distance is >3m, it is recommended to have the both side to have the sampling tube network

Warehouse Design

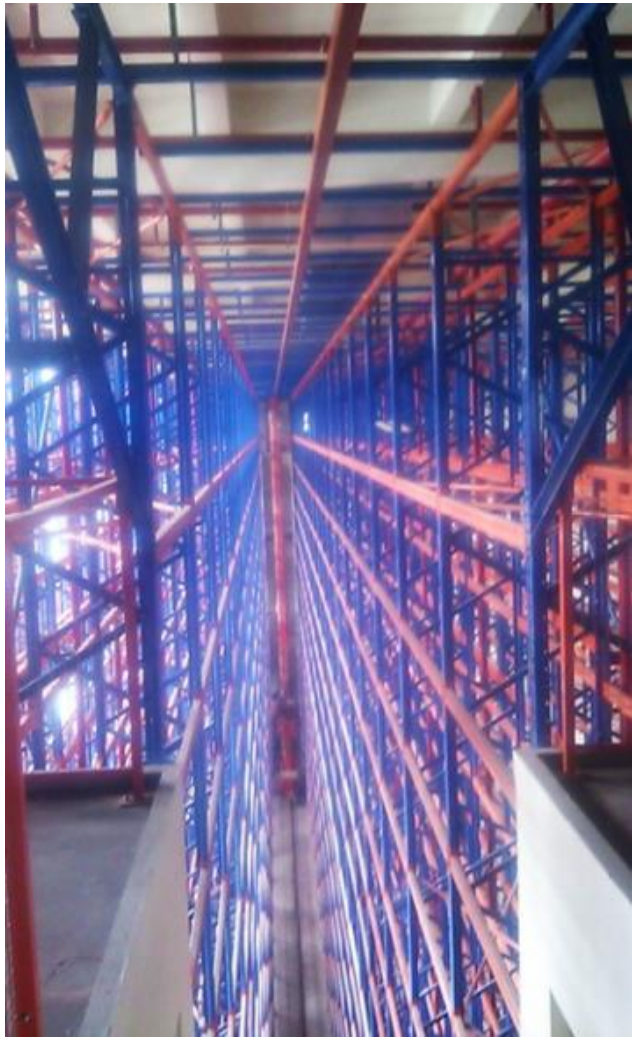






AVA PREVENT
Aspirating Cabinet Smoke Detection

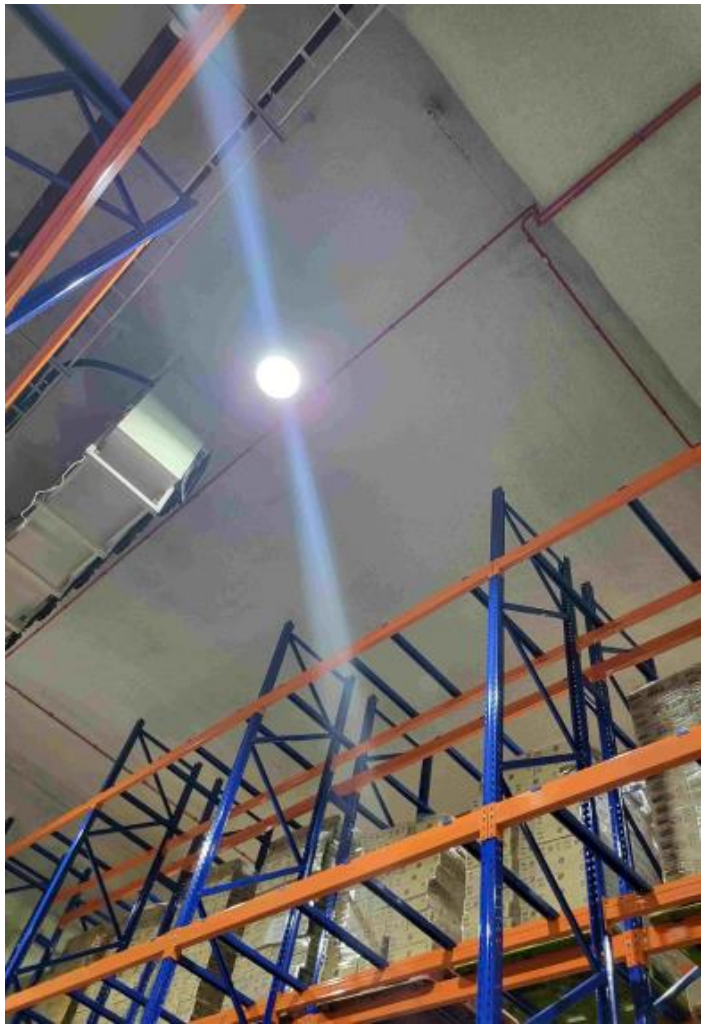
Warehouse/ Installation Example



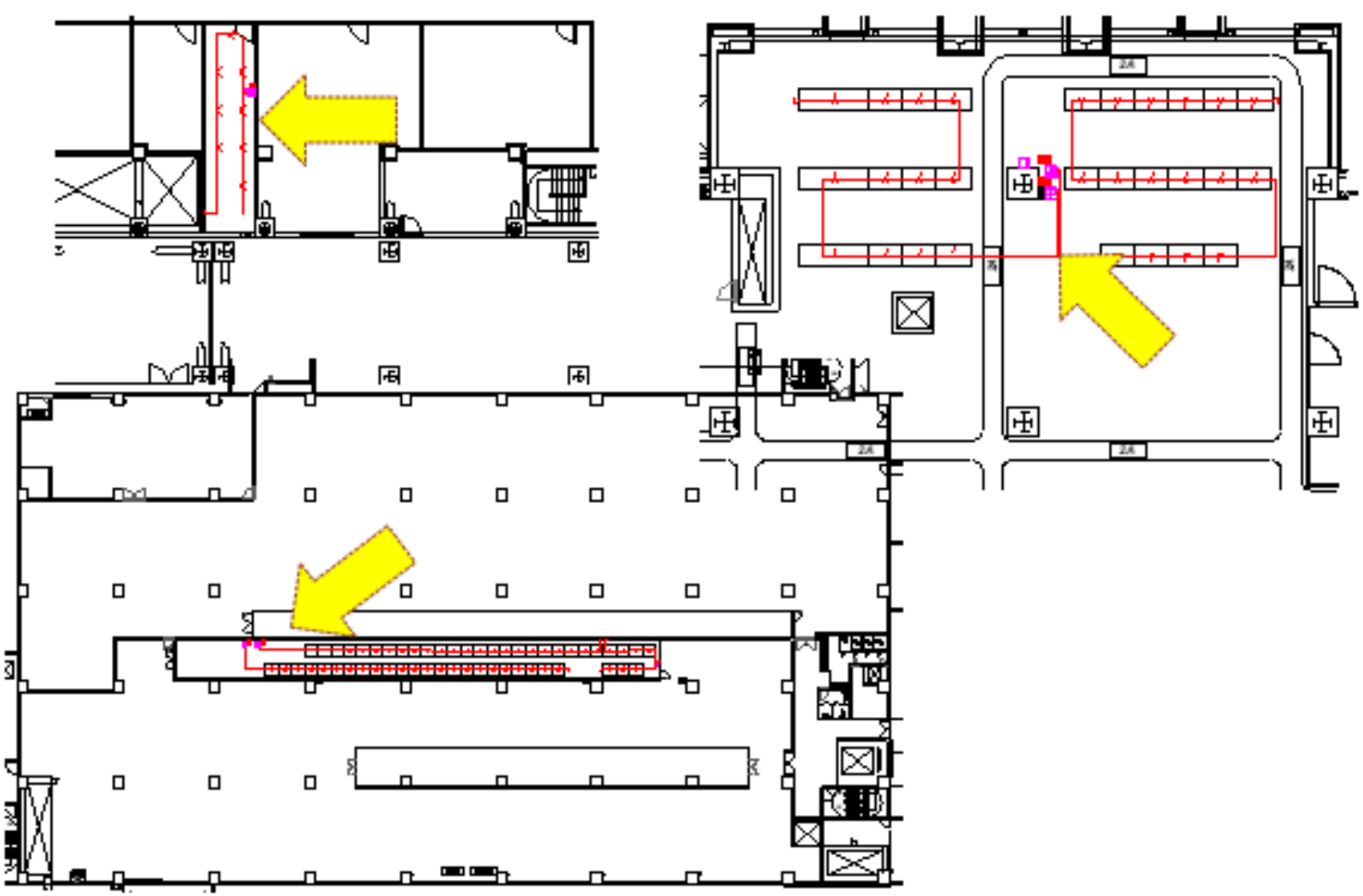
AVA PREVENT
Aspirating Cabinet Smoke Detection

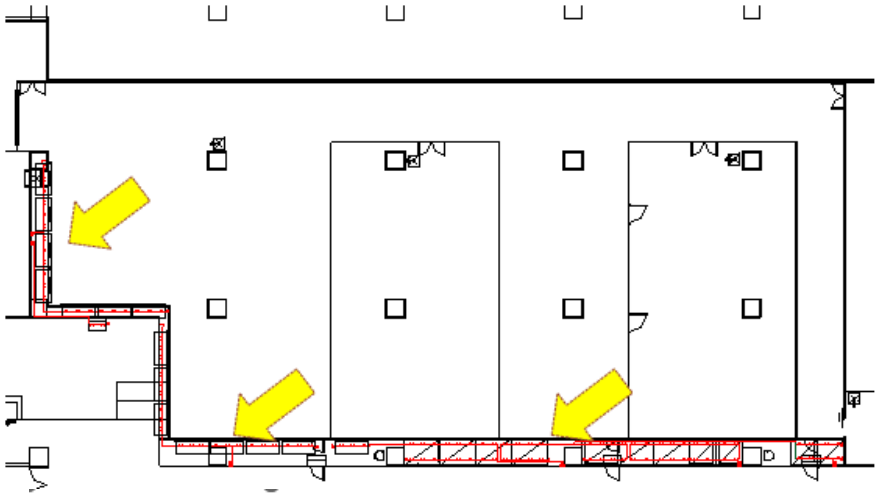
Warehouse/ Installation Example

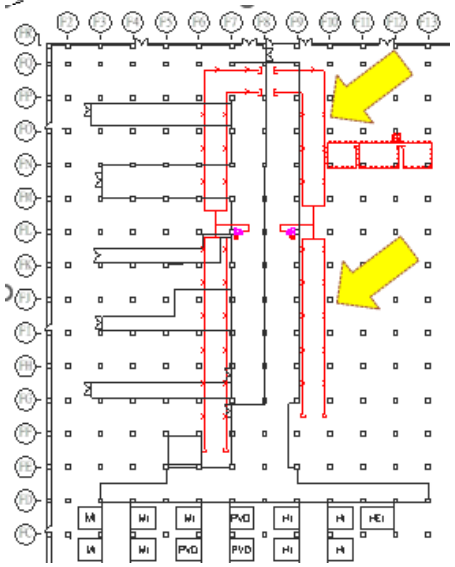
Warehouse/ Installation Example



Warehouse/ Installation Example







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Installation

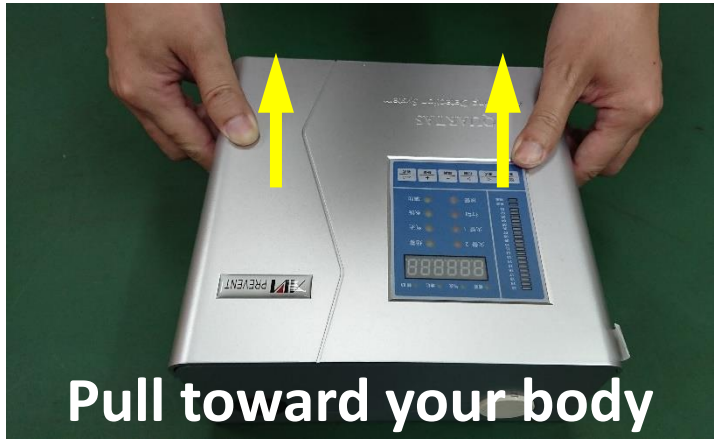
Sampling Tube Installation Notes

- Sampling Tube Materials normally is ABS or uPVC. Special condition, Metal, stainless steel, etc materials can be used that fulfilled the specification
- Sampling Tube Mounting – Between 1 – 1.5m to avoid no linear of the sampling tube installation.
- Highly recommend to use 90° big bend, if not available, use 2 x 45° bend to form a 90° bend. Do Not Recommend to use 90° elbow.
- Capillary Tube Length recommend less than 1.2m. In extreme case MUST not exceed 6m.
- Direct Drill of sampling hole shall be straight 90° and not have debris at the side.
- Sampling hole or capillary sampling point shall have appropriate label for identification. It is NOT allowed to have sampling hole or point without label.

Open Quartas ASD

To Open Cover of Quartas-500s

Step 1 : Open Top Body



Step 2 : Open Lower Body

To Open Cover of Quartas-2000s

Sampling Tube and Fitting

ABS 25mm Tube

Sample Hole Quantity	End Cap Diameter (mm)
1~5	8Φ
6~10	6Φ
11~15	4Φ
16~20	3Φ
21~25	2Φ

Label

45 elbow

2 x 45 elbow

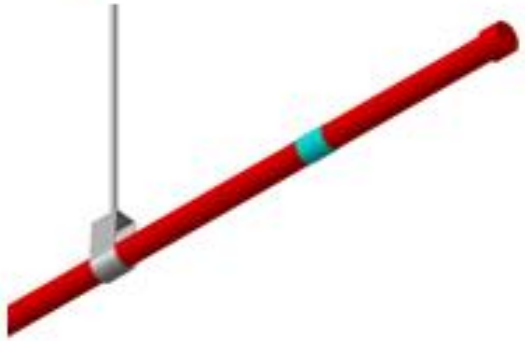
End Cap

Socket

Bead Sampling Point

Tee Piece + Connector + Pneumatic Fitting + PU + Bead Sampling Point

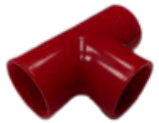
Sampling Tube and Fitting



Sampling Accessories

Product	Part NO.	Description
	ASP-0001	Standard Sampling Point Label per 6
	ASP-0002	Sampling Hole Label per 10
	ASP-0003	Brass Sampling Point (hole size: 2mm)
	ASP-0004	Pneumatic Fitting (for Tap Connector Thread 1/2”)
	ASP-0005	Standard Sampling Point Assembly (Bead Sampling Point – Washer - Nut)
	ASP-0006	ABS Air Sampling Pipe Red - 4m (O/D: 25mm I/D: 21mm) * Price is per pipe (4m). * For Export Delivery is 2m – additional socket will be required

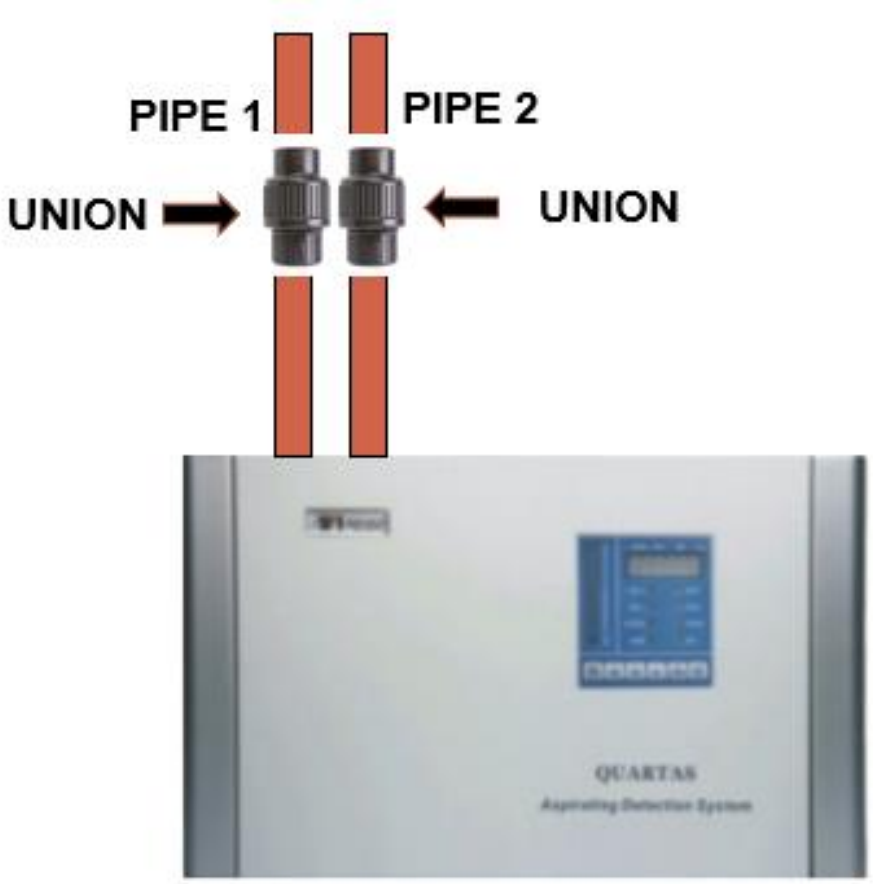
Sampling Accessories

Product	Part NO.	Description
	ASP-0007	ABS Socket Red
	ASP-0008	ABS 45° degree Elbow Red * 2 units of ASP-0008 to form a 90° degree Elbow
	ASP-0009	ABS End Cap Red
	ASP-0010	ABS ‘T’ Piece Socket Red
	ASP-0011	ABS Glue – 250mL
	ASP-0012	PU Tube 5x8mm (100m/Roll) * Brass Sampling Point not Included * Price is per roll

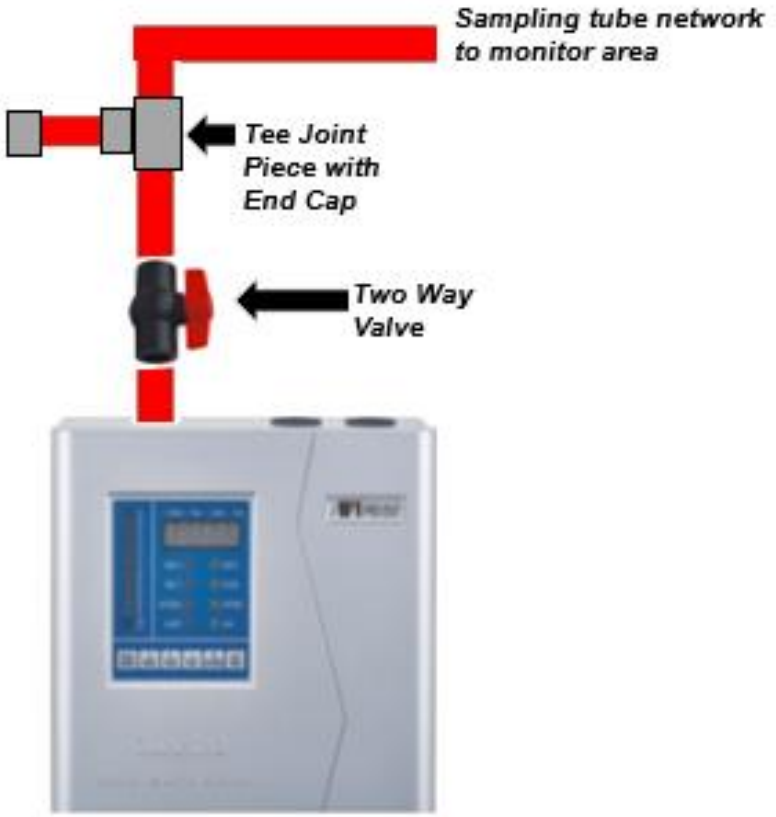
Sampling Accessories

Product	Part NO.	Description
	ASP-0013	Connector
	ASP-0014	Bead Sampling Point
	ASP-0015	Washer for Bead Sampling Point
	ASP-0016	Nut for Bead Sampling Point
	ASP-0017	Tube Sampling Point
	ASP-0018	Union, grey
	ASP-0019	Pipe Clip

Maintenance Concept



Maintenance
For connection to compress gas



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DO and DO NOT

DO

- Highly Recommend to have Maintenance Pipe near to Outlet of the ASD Detection Unit – For Maintenance Purpose and Easy Testing Purpose. All Joint (Except to the ASD Detection Unit and UNION) should be glue with correct type of glue.
- Apply Glue on the pipe and not the fitting (socket, Tee adapter)
- Label the sampling holes and bead sampling points (Easy identification of the sampling hole)
- Sampling Tube Network shall be straight and neat with Clear Label that the tubing is for Aspirating Smoke Detector

DON'T

- DON'T Glue the pipe enter to the ASD Detection Unit and the Union
- DON'T use Saw to cut the pipes
- DON'T install ASD Detection Unit at the point which cannot access
- DON'T Power on the ASD Detection Unit until the input terminal is check with Multi-meter that the incoming voltage is in proper range of 24VDC

AVA PREVENT
Aspirating Cabinet Smoke Detection

Commissioning

COMMISSIONING

1. Visual Inspect Sampling Tube Network as according to design
2. Make sure the sampling hole diameter follow AVA Flow Calculation Software.
3. Visual check the INCOMING wiring 24VDC from the UPS
4. Visual check the OUTCOMING wiring to other interface such as Notification devices, Fire Alarm Module, Network Connection
5. Check and record down the Serial Number of the AVA Devices
6. Fill in the Commissioning Protocol with correct information
   - Application Type
   - Output interface
   - Networking
   - Alarm Threshold with Delay, Fan Speed, Air Flow Setting
   - Functionality Test
7. Power Up the system
8. Normalize / Configure / Change Parameter on AVA Devices
   - Setting Date and Time
   - Configure Alarm Threshold (Depends on application / local regulation / customer requirement
9. Perform functionality test
   - Smoke Test from furthest sampling point
   - Air Flow Fault

COMMISSIONING WITH DEFAULT PARAMETER

1. Power Up the system
2. Enter Programming Mode to Change Date and Time **(Menu 14)** of AVA Device
3. ENABLE FILTER (ASD Filter Fault 2 years of SET NEW FILTER DATE)
   a) ENABLE Optional Filter User **(Menu 20)**
   b) SET NEW Filter Used **(Menu 6)**
4. Wait AVA Device to complete the ***AUTO*** Smoke Learning (Approximately 2 to 3 minutes) ***AUTOMATIC PERFORMED***
5. Wait AVA Device to complete the ***AUTO*** Air Flow Normalize (Range from 3 – 15 minutes depends on the length / no of sampling holes) **** AUTOMATIC PERFORMED***

CONFIGURE OTHER PARAMETER

IF WANTED TO CONFIGURE FOR OTHER MENU

- Repeat the steps for “Entering Programming Mode”
- Go to the select the menu function that you wish to configure or change the parameter.
- Follow the steps as per Change Alert Delay from to 5 seconds delay
- For the Parameter menu, refer to the latest technical manual.

POWER UP SYSTEM

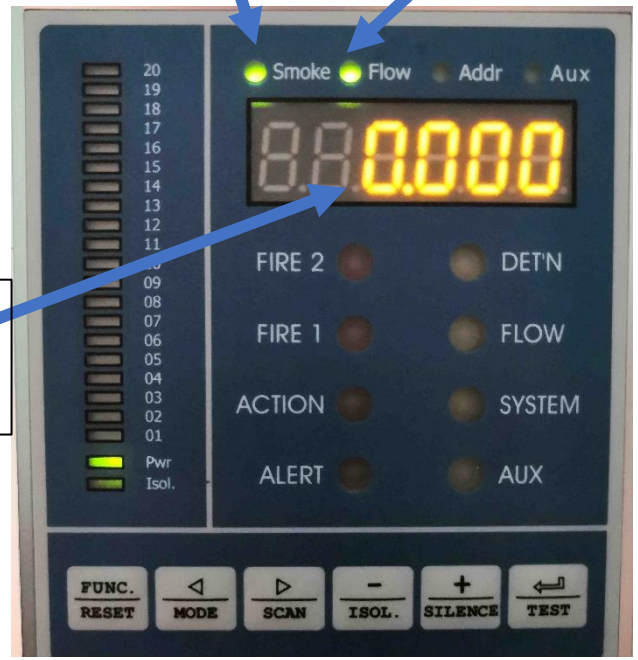
STEP 1

1. Supply 24VDC to the AVA Devices
2. When AVA Device to start-up, it will perform the Normalize Process
3. It will perform Fast Learn for ***Smoke*** Background Learning (Take 2 – 3 minutes).
   - Smoke LED will blink slowly to indicate it is performing Smoke Learning
4. It will perform the Normalize of the ***Air Flow*** (Take 3 – 15 minutes)
   - Flow LED will blink slowly to indicate it is performing Flor Normalization
5. After completed ***Smoke*** learning (Smoke LED Stop Blinking), you can see the 0.000 to indicate the smoke value. ***Automatic***
6. After completed the ***Flow*** (Flow LED Stop Blinking), the air flow value will be near to 100 ***Automatic***

Start up - Smoke LED Blinking
Constant On – AVA Device Ready for Detection

Start up - Flow LED Blinking
OFF – AVA Device complete Flow Normalize

Indicate Sampling Smoke Value



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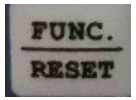
ENTER PROGRAMMER MODE

STEP 2a

To Enter into Programming Mode

1. Press and Hold the button "FUNC" 

for 2 second

2. When 01 LED indicator started to Flash
   a) Press "-" 

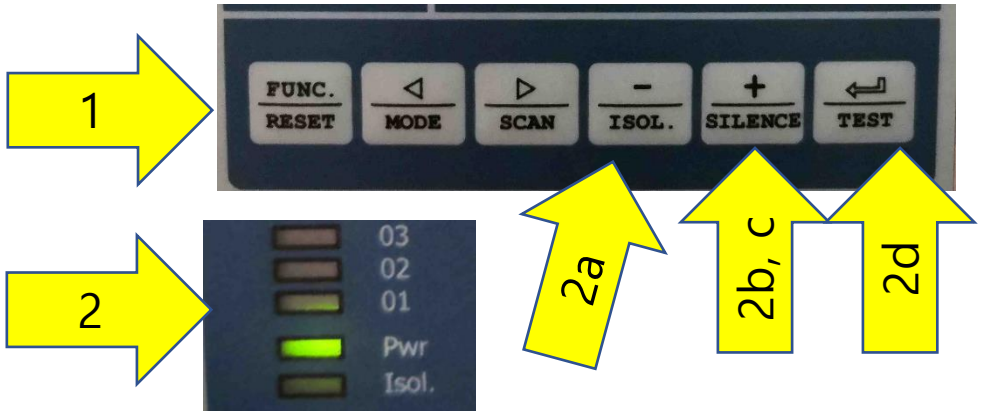
   b) Press "+" 

   c) Press "+" 

   d) Press Enter 

for few seconds

3. LED will display "PASS" if password is correct, otherwise it will display "FAIL"



AVA PREVENT
Aspirating Cabinet Smoke Detection

SET DATE AND TIME

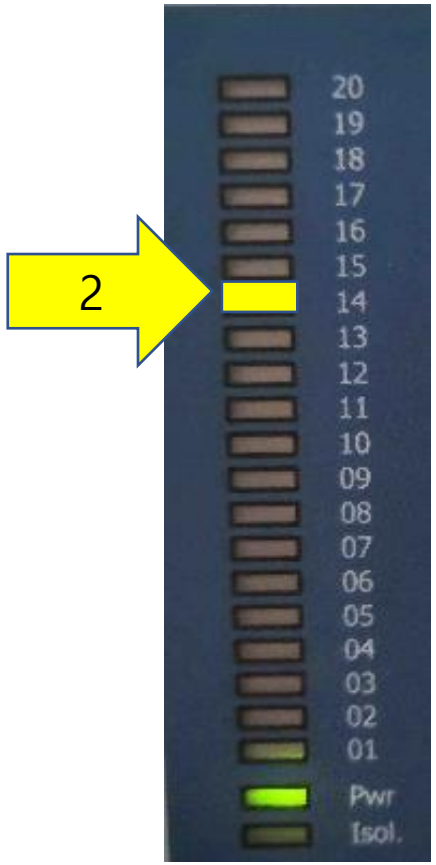
Menu 14

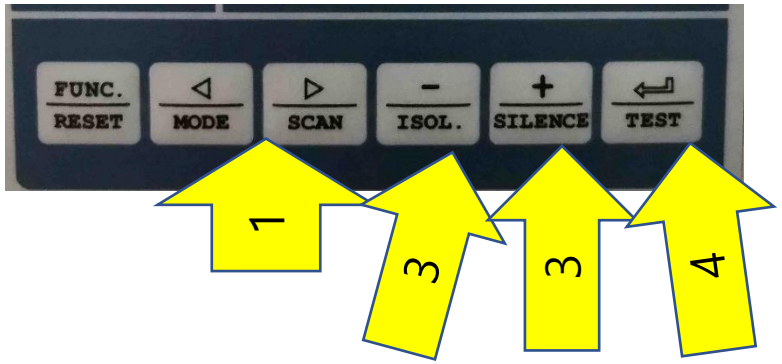
STEP 2b

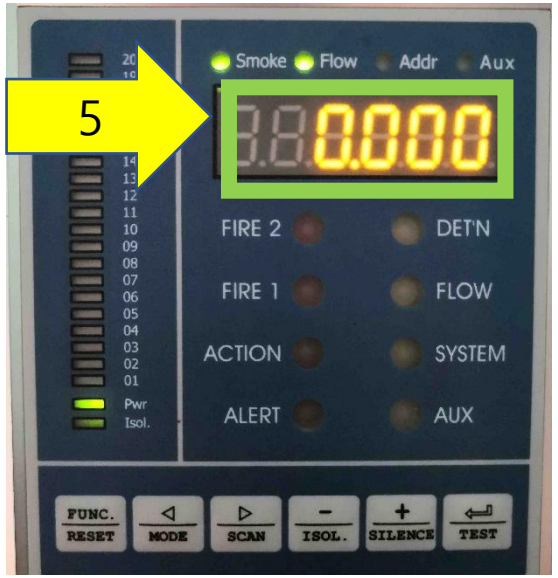
AFTER Enter into Programming Mode

1. Go to Menu no. **14** by using the ◁ or ▷ key

2. LED Number will indicate which menu is currently selected. I.e. LED No. 14 will BLINK when menu 14 is selected
3. Use the "+" SILENCE or "-" ISOL. to change the parameter.
4. Press Enter TEST to save the parameter to AVA Device
5. LED Display will flash when saving the parameter to the device







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ENABLE FILTER MONITORING

Menu 20

STEP 3a

TO SET NEW FILTER FOR SYSTEM
ASD will report FILTER FAULT 2 Years from Set Date

AFTER Enter into Programming Mode

1. Go to Menu no. **20** by using the or key
2. LED Number will indicate which menu is currently selected. I.e. LED No. 20 will BLINK
3. Use the until it display "**OF. OFF**" which is the current setting for No Option Filter is Set.
4. Use the "+" to go the menu that change the parameter until it show "***OF. ON***"
5. Press Enter to save the parameter to AVA Device
6. LED Display will flash when saving the parameter to the device
7. After that, proceed to next step for setting New Filter Use

AVA PREVENT
Aspirating Cabinet Smoke Detection

SET NEW FILTER

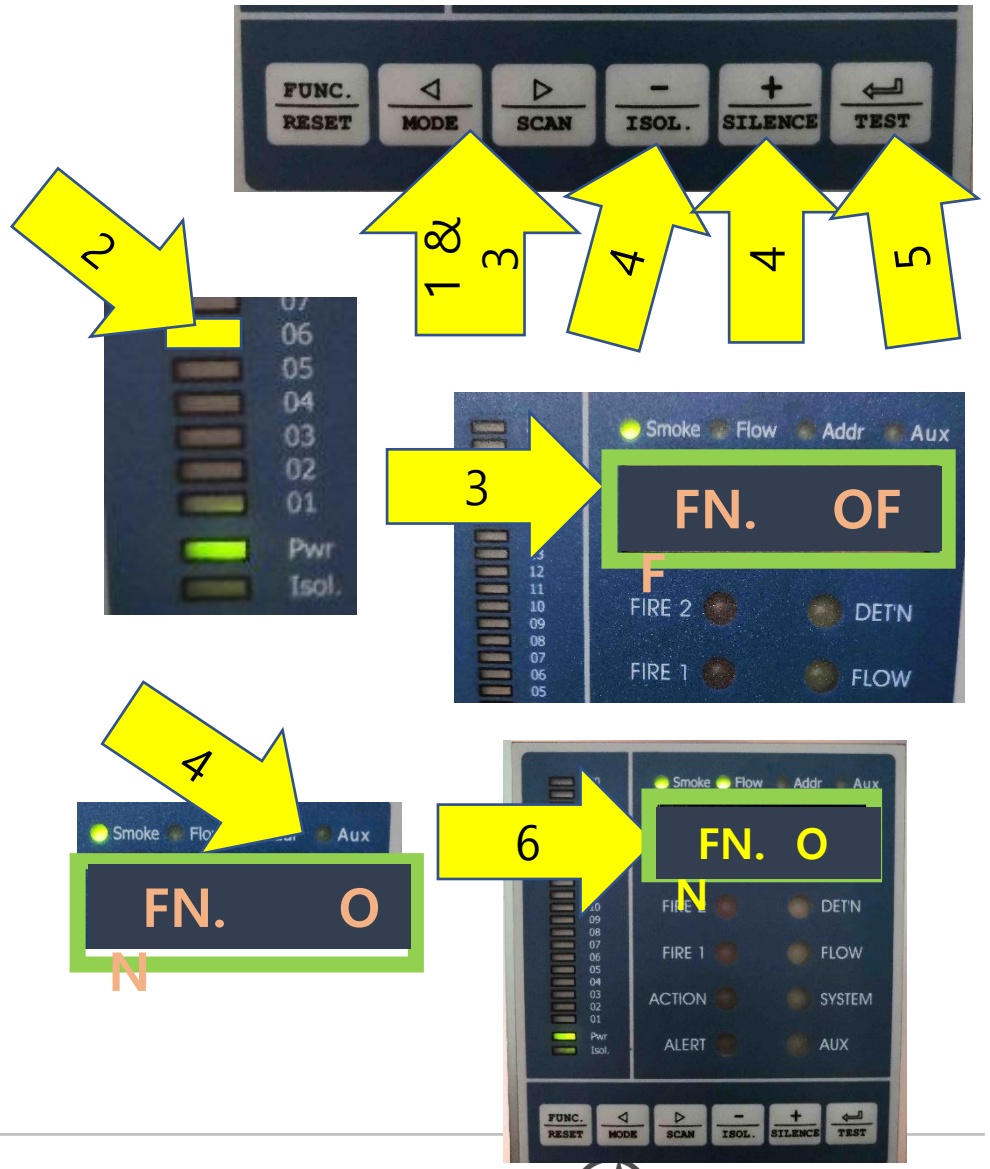
Menu 06

STEP 3a

TO SET NEW FILTER FOR SYSTEM
ASD will report FILTER FAULT 2 Years from Set Date

AFTER Enter into Programming Mode

1. Go to Menu no. **6** by using ◁ the or ▷ key
2. LED Number will indicate which menu is currently selected. I.e. LED No. 6 will BLINK
3. Use the ▷ until it display "**FN. OFF**" which is the current setting for No New Filter Set.
4. Use the "+" SILENCE to go the menu that change the parameter until it show "***FN. ON***"
5. Press Enter TEST to save the parameter to AVA Device
6. LED Display will flash when saving the parameter to the device
7. After that, the LED will display "**FN. OFF**"



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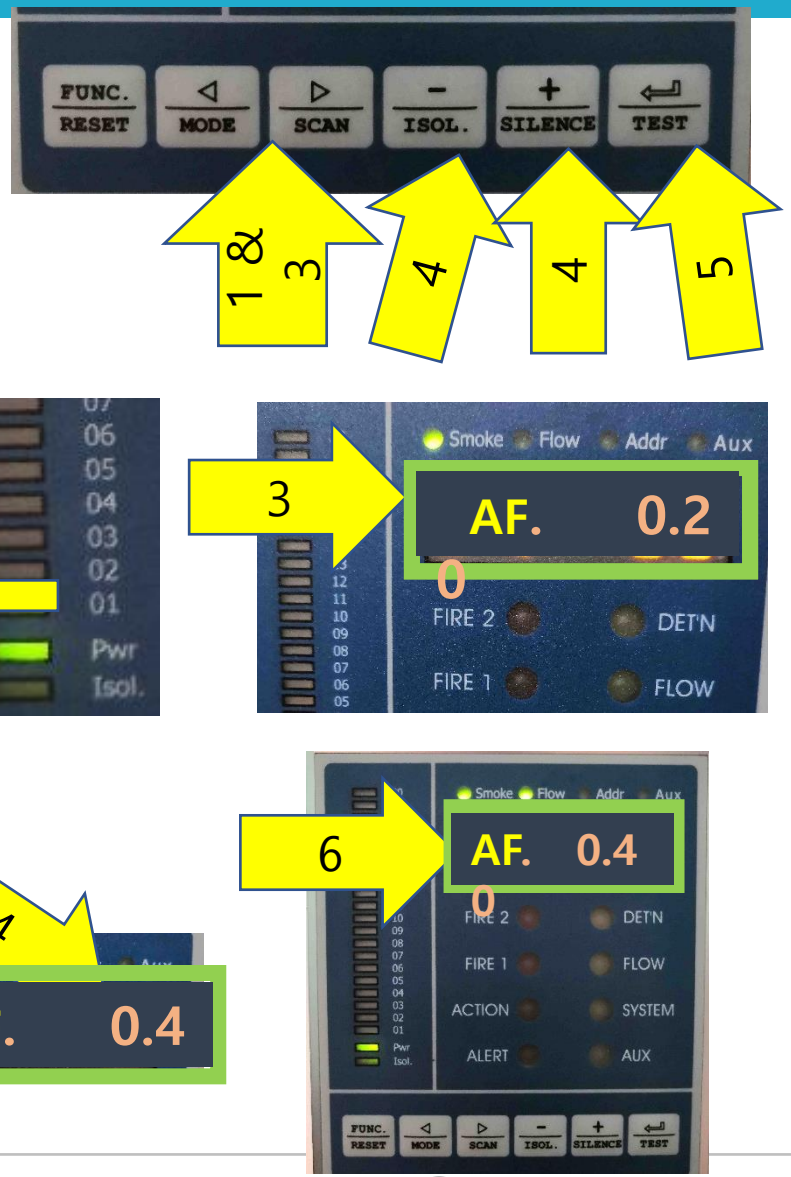
CONFIGURE ALARM THRESHOLD (Optional)

Menu 01

TO CHANGE THE FIRE 1 Alarm Threshold FROM 0.20 TO 0.40

AFTER Enter into Programming Mode

1. Go to Menu no. 1 by using ◁ the or ▷ key
2. LED Number will indicate which menu is currently selected. I.e. LED No. 1 will BLINK
3. Use the ▷ until it display "***AF. 0.20***" which is the current Full Scale Sensitivity setting.
4. Use the "+" SILENCE to go the menu that change the parameter until it show "***0.40***"
5. Press Enter TEST to save the parameter to AVA Device
6. LED Display will flash when saving the parameter to the device



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CONFIGURE AIR FLOW MORNITORING THRESHOLD (Optional)

Menu 03

TO CHANGE THE AIR FLOW SETTING FOR HIGH LOW FAULT FROM 120 to 130

AFTER Enter into Programming Mode

1. Go to Menu no. **3** by using ◁ the ▷ or key
2. LED Number will indicate which menu is currently selected. I.e. LED No. 3 will BLINK
3. Use the ▷ until it display "**H. 120**" which is the current setting for Pipe Flow High of 120. This mean Air Flow High (Pipe Breakage Fault will become active when it exceed 120 value) here
4. Use the "+" to go the menu that change the parameter until it show "***130***"
5. Press Enter – ISOL. to save the parameter to AVA Device
6. LED Display will flash when saving the parameter to the device

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CONFIGURE FAN SPEED (Optional)

Menu 03

TO CHANGE THE ASPIRATOR SPEED FROM 5 to 7

AFTER Enter into Programming Mode

1. Go to Menu no. **3** by using ◁ the ▷ or key
2. LED Number will indicate which menu is currently selected. I.e. LED No. 3 will BLINK
3. Use the ▷ until it display "**F. 5**" which is the current setting for Aspirator speed setting of 5.
4. Use the "+" SILENCE to go the menu that change the parameter until it show "***7***"
5. Press Enter TEST to save the parameter to AVA Device
6. LED Display will flash when saving the parameter to the device

After Change Fan Speed, Normalize air flow will need to be performed. Go to Menu "4"

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TO NORMALIZE AIR FLOW

Menu 04

TO Normalize Air Flow

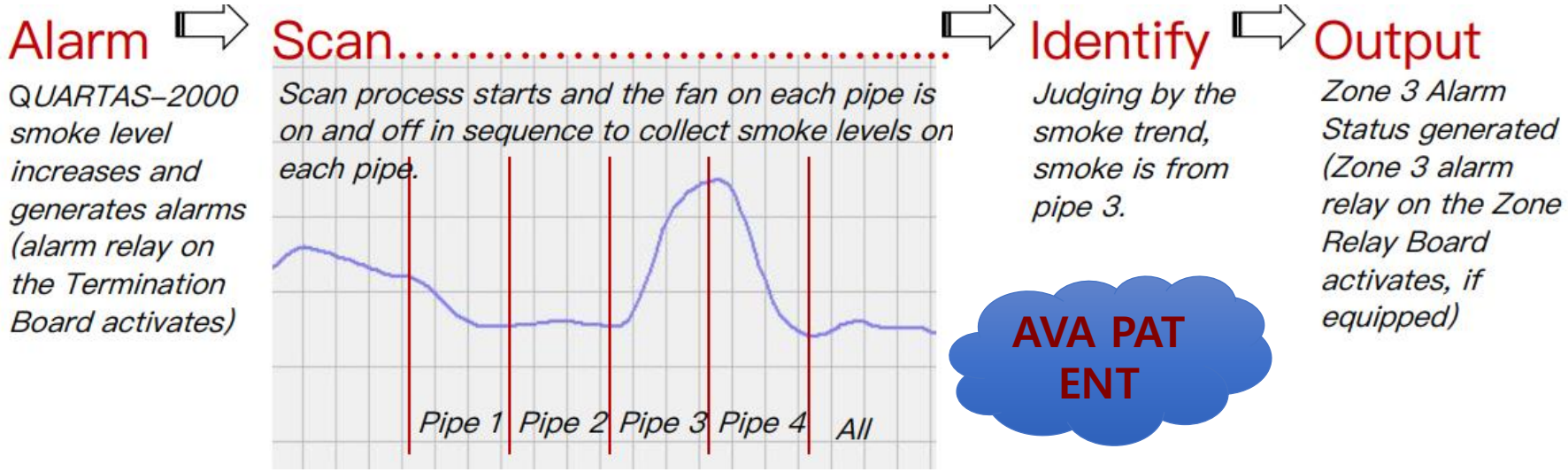
AFTER Enter into Programming Mode

1. Go to Menu no. **4** by using the ◁ or ▷ key
2. LED Number will indicate which menu is currently selected. I.e. LED No. 4 will BLINK
3. Use the ▷ until it display "**NF. OFF**" which is the current setting for Normalize Air Flow.
4. Use the "+" SILENCE to go the menu that change the parameter until it show "***ON***"
5. Press Enter TEST to save the parameter to AVA Device
6. LED Display will flash when saving the parameter to the device

AVA PREVENT
Aspirating Cabinet Smoke Detection

QUARTAS-2000s SCANNING FUNCTION

- ZONE SCAN FUNCTION OPERATING PRINCIPLE
  - Quartas-2000s can turn Each Aspirator ON and OFF in sequence where there is smoke Alarm to identify which pipe is having the Most Smoke.
  - Quartas-2000s will detect smoke and General Alarm Relay will be activated, Alarm LED will Light on.
  - Scan process start to scan pipe 1 (Turn on Aspirator #1, Turn off Aspirator #2, #3, #4), collect the smoke level for pipe 1 according to scan time setting. This process will repeat to scan pipe 2, pipe 3, pipe 3 respectively.
  - During scan process, the 6 digit Numerical display will flash and show the scan pipe number and its smoke level. The result of the scan will be shown on the display event log and the Alarm relay on the Zone Relay Board will be activated



AVA PREVENT
Aspirating Cabinet Smoke Detection

QUARTAS-2000s SCANNING FUNCTION

SCANNING FUNCTION WILL ACTIVATE BY 3 METHOD Mentioned below

1. **AUTOMATIC**
   - When Quartas-2000s smoke reach the setting under menu 19 – Scan Level. Example in this menu above, Quartas-2000s will start scanning when it reach Scan Level “3” which is Fire 1 signal
2. **MANUAL**
   - Activate from Front Panel – Press and Hold the “SCAN” button
3. **GPI INPUT ACTIVE**
   - Activate the GPI Input.
   - GPI Setting need to be configure, refer to menu 10 of AVA Devices

QUARTAS-2000s SCANNING FUNCTION

NUMERICAL LED DISPLAY

1. During Scanning period, the display will show individual pipe smoke value.

2. Upon completion of the sca nning, we can check the sca nning result by change to t he mode "AUX"

3. To Activate SCAN function manually,
   - Press the SCAN button f or 5 seconds.

AVA PREVENT
Aspirating Cabinet Smoke Detection

QUARTAS-2000s SCANNING FUNCTION

IMPORTANT NOTES

- IF after scanning result is negative and Quartas-2000s cannot identify which pipe detect the smoke, it will Automatically perform second time scanning. When 2nd scanning process cannot get the positive result and determine which pipe have the smoke, it will stop the scanning and will not have any output activated.
- Manual Activation of Scanning can help to START Quartas-2000s to perform the scanning function. Example, when Quartas-2000s automatically scanning time function is set to "Fire 1", when the ASD detect Alert / Action. Local Operator arrive monitoring area and cannot identify where the smoke from, then scan activate the Manual Activation to start the scanning and help to identify where the smoke come from.
- When Quartas-2000s on Alarm, Manual activation of the scanning process
  - Scanning result will be according the current alarm status to activate the Zone Relay from the Zone Relay Board to Fire Alarm Panel
- Manual Activation during NON-ALARM Stage, the result of the scanning will activate the output, local operator will required the smoke value from each pipe to evaluate the next course of action.

QUARTAS-2000s SCANNING FUNCTION

IMPORTANT NOTES

- If there are unused pipe. The aspirator setting will be set at "0", thus scanning process will not be perform for this pipe.

- When Scan Level is set at Higher Status, upon completion of the scanning, the Lower Status of the alarm will be activated at the same time. Example
  - When Scan Level is set up "Fire 1", upon completion of the scanning, the zone relay board will activate the "Alert" Relay, "Action" Relay" and "Fire 1" Relay.

- When Scan Level is set at Lower Status, upon completion of the scanning for that level, then only it will perform the scanning for the next higher level. Example
  - When Scan Level is set at "Alert", Quartas-2000s will start scanning when it reach Alert Level.
  - Upon completion of the scanning action which required by "Alert" scan level, then Quartas-2000s ONLY will determine whether the smoke detected had reach "Action" Alarm Threshold.
  - This principle will apply the same for other Scan Level setting.

SETUP QUARTAS-2000s SCANNING FUNCTION

1. Enter Programming Mode to Change SCAN Setting **(Menu 19)** of AVA Device

2. Enable Zone Relay Module Used

    a) ENABLE Zone Relay Used **(Menu 20)**

    b) Configure Zone Relay If Necessary **(Menu 11) * If Required. The Default Setting if "Zone Fault, Zone Alert, Zone Action and Zone Fire" which is common use. If Not Change required, Step s 2 can be skipped.**

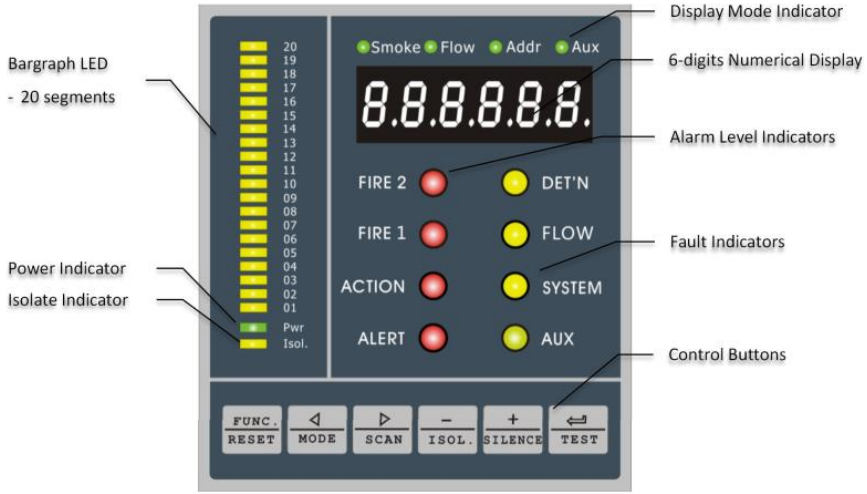
AVA PREVENT
Aspirating Cabinet Smoke Detection

OPERATION

FRONT DISPLAY

DISPLAY FUNCTION

Indicator (Color)	Description
PWR = Power (Green)	Indicate Quartas is powered
ISOL = Isolated (Yellow)	When Quartas is isolated * Isolated Relay will activate
20 Segment Bar Graph (Yellow)	Display Real-Time smoke level detected with full scale of Fire 1 Level In Program Mode, individual bar graph LED flashing indicates current parameter no
DET'N (Yellow)	Smoke Detector Fault * Fault Relay will activate
FLOW (Yellow)	Air Flow Fault, Air Flow Sensor Failure, Aspirator Failure. * Fault Relay will activate
SYSTEM (Yellow)	All Other Fault (Exclude Det and Flow Fault). * Fault Relay will activate
AUX (Yellow)	Any one of the GPI Input is Active. * Auxilliary Relay will activate



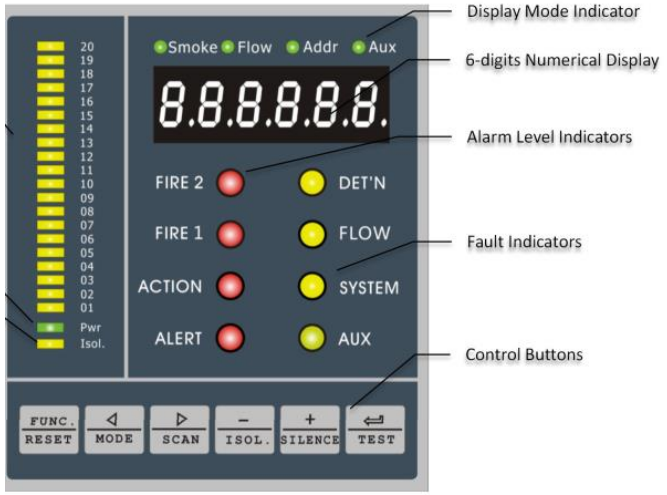
Alert (Red)	**Indicate reach AlertAlarm Threshold.** *** Alert Relay will activate**
Action (Red)	Indicate reach Action Alarm Threshold. * Action Relay will activate
Fire 1 (Red)	Indicate reach Fire 1 Alarm Threshold. * Fire 1 Relay will activate
Fire 2 (Red)	Indicate reach Fire 2 Alarm Threshold. * Fire 2 Relay will activate

AVA PREVENT
Aspirating Cabinet Smoke Detection

FRONT DISPLAY

CONTROL FUNCTION

Key	Description
FUNC	To Enter into Programming Mode
RESET	Reset Quartas
◁	To move LEFT when the Quartas is in the Display Mode. It will toggle from "SMOKE" → "AUX" →"ADDR" → "FLOW"
MODE	To select the Numeric Display Mode from "SMOKE", "FLO W", "ADDR" and "AUX"
▷	To move RIGHT when the Quartas is in the Display Mode. It will toggle "SMOKE" → "FLOW" → "ADDR" → "AUX"
SCAN	No Function for Quartas 500s
"-" and "+"	Password Access into Programming Mode Editing the parameter when in Programming Mode
ISOL	To Isolate or De-Isolate the Quartas
SILENCE	To silence the internal buzzer
TEST	To perform Display Test, LED Test and Buzzer Test on Qua rtas
↵	Save the configuration setting when in programming mo de



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FRONT DISPLAY

NUMERICAL DISPLAY

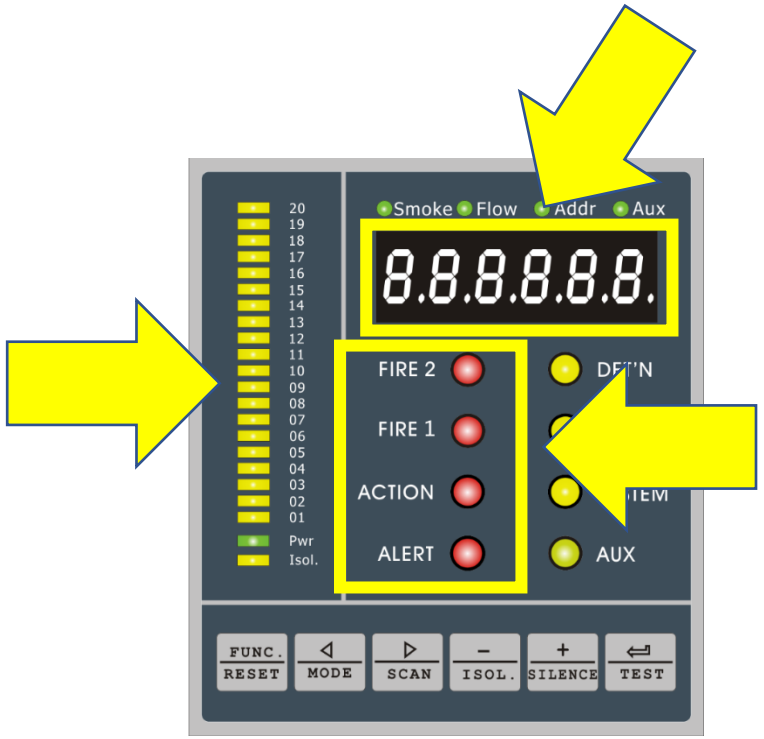
Key	MODE	Description	LED	Numerical Display Range
SMOKE	Normal / Ready Detection	Indicates Current Smoke Concentration Reading	ON	0.000 – 25.00 %/m
	Program	Indicates Smoke Related Parameter	ON	
	Start Up	Performing Smoke Learning Function	Flashing	
FLOW	Normal / Ready Detection	Indicate Current Air Flow Reading in percentage * 100 is Correct Value after Flow Normalize	ON	0 – 200 %
	Program	Indicate Flow Related Parameter	ON	
	Start Up	Performing Air Flow Normallization	Flashing	
ADDR	Normal / Ready Detection	Display the RS 485 Networking Device Address	ON	0 - 255
AUX	Normal / Ready Detection	Display Current Event Code * Refer to Technical Manual for Details Event Code	ON	A1 – A4 (Smoke Alarm) A5 – A15 (Auxiliary Alarm) E0 – E29 (Fault Event) E31 – E32 (Learning) E30 & E33 (Isolated)

AVA PREVENT
Aspirating Cabinet Smoke Detection

INSPECTION TESTING

SMOKE TEST

1. Introduce smoke from the furthest sampling point and Quartas-ASD should receive smoke within 120 seconds.
2. You will see the smoke value start to rise from the LED indicator
3. Check Quartas-ASD LED activated from Alert, Action, Fire 1, and Fire 2
4. Check Alert, Action, Fire 1 and Fire 2 Relay activated
5. Wait until smoke is lower than alarm threshold point (0.2% obs/m) before pressing the Reset button. You can see from the Front display for that value and also the LED bar graph for the level.



AIR FLOW TEST

READ CURRENT AIR FLOW

- Press the ▷ until the LED show to "***FLOW***". It will display current air flow value.
- When ASD Display Current Air Flow Value in the range of 100. This is the BASE value after the ASD has will use this value to evaluate Pipe been normalize.

NORMAL CONDITION

FLOW TEST

1. Block the sample hole, you will see the flow will drop. When it drop below 70, after approximately 1 min, Quartas-ASD will show FAULT.
2. Check Fault Relay activated
3. Check FLOW Fault LED light on

AVA PREVENT
Aspirating Cabinet Smoke Detection

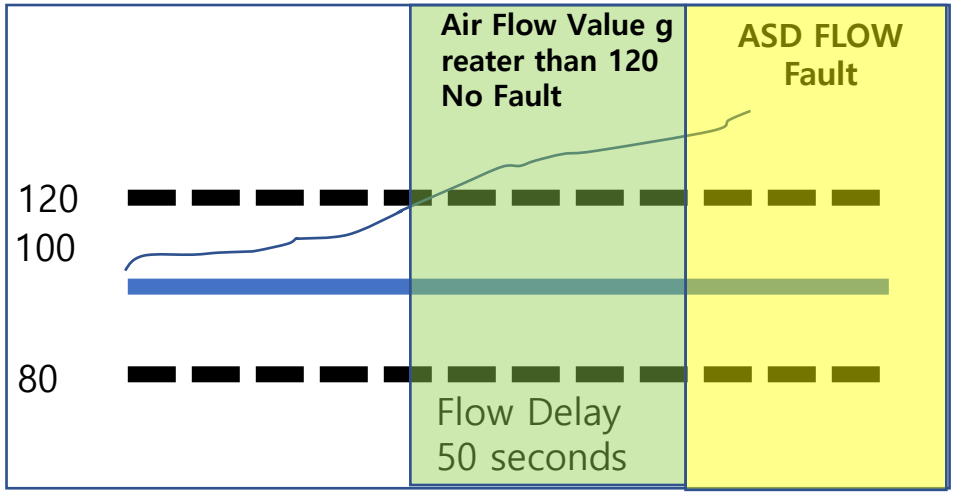
AIR FLOW TEST

READ CURRENT AIR FLOW

- Press the ▷ until the LED show to "***FLOW***". It will display current air flow value.
- When ASD Display Current Air Flow Value in the range of 100. This is the BASE value after the ASD has been normalize.
- ASD will use this value to evaluate Pipe Breakage (When value getting bigger, i.e. more air goes into air flow sensor) or Hole Blockage situation (When value getting smaller, i.e. less air goes into air flow sensor)
- When FLOW Fault active, Numerical display will change to AUX and display the time and time and event code
- When FLOW back to normal monitoring window, ASD will automatically reset the fault.

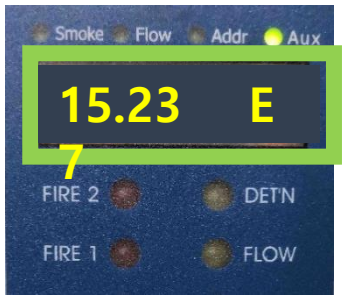
NORMAL CONDITION

ASD Air Flow Monitoring Principle



AUX Display Date and Time and Event Code

After Flow Fault



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OTHER FUNCTION - MODE

READ AVA DEVICE NETWORK ADDRESS

- Press the ▷ until the LED show to "***ADDR***". It will display Network Address.

READ ACTIVE EVENT *

- Press the ▷ until the LED show to "***AUX***". It will display Event Code.
- Total active even will display first
- Press - ISOL. + SILENCE to show detail event message, including date, time and event code.
- If 2 events occurred, e.g A0 and E11. It will first display 2, press + SILENCE will show A0 event, press + SILENCE will show event E11
- Refer technical manual for detail event code meaning

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Aspirating Cabinet Smoke Detection

ACTIVE EVENT

- When event occurred, the LED display will show th e date and time when the event code * Automatic scrolling type on the numerical LED display.
- Select the mode function to "***AUX***" to check the e vent code and refer to technical manual for event code meaning
- Example in this slide is event code show E7 would mean Pipe Flow High Fault and "***FLOW***" LED will li ght up and

Active Event E7

Flow Fault	E5	Aspirator Failed
	E6	Flow Sensor Failed
	E7	Pipe Flow High Fault
	E8	Pipe Flow Low Fault
	E9	Normalization Failed

EVENT CODE

AUX MODE DISPLAY ACTIVE EVENT CODE

☐ **Event code**

Types	Code	Description
Smoke Alarm	A1	Alert
	A2	Action
	A3	Fire 1
	A4	Fire 2
Auxiliary Sensor Alarm	A5	Sensor 1 High Alarm
	A6	Sensor 1 Low Alarm/High High Alarm
	A7	Sensor 2 High Alarm
	A8	Sensor 2 Low Alarm/High High Alarm
	A9	Sensor 3 High Alarm
	A10	Sensor 3 Low Alarm/High High Alarm
	A11	Sensor 4 High Alarm
	A12	Sensor 4 Low Alarm/High High Alarm
	A13	Sensor 5 High Alarm
	A14	Sensor 5 Low Alarm/High High Alarm
Smoke Detection Fault	E1	Smoke Detector Failed
	E2	Smoke Detector Service Required
	E3	Smoke Level High
	E4	Smoke Level Low
Flow Fault	E5	Aspirator Failed
	E6	Flow Sensor Failed
	E7	Pipe Flow High Fault
	E8	Pipe Flow Low Fault
	E9	Normalization Failed
	E17	Filter Blockage
	E18	Filter Removed
	E19	Filter Due
Comms. Fault	E10	Programmer Not Found
	E11	Fan Board Not Found
	E12	Zone Relay Board Not Found
	E13	HSSD Not Found
	E14	Auxiliary Sensor Board Not Found
System Fault	E20	Power Fault
	E21	Battery Fault
	E22	Mains Fault
	E23	RTC Fault
	E24	Sensitivity Mode Confliction
Auxiliary Sensor Fault	E25	Sensor 1 Failed
	E26	Sensor 2 Failed
	E27	Sensor 3 Failed
	E28	Sensor 4 Failed
	E29	Sensor 5 Failed
Learning	E31	Flow Normalization
	E32	Smoke Background Learning
Isolation	E30	Device Isolated
	E33	Zone Isolated

AVA PREVENT
Aspirating Cabinet Smoke Detection

MENU PARAMETER

QUARTAS PARAMETER

Q500s | Q2000s

No	Menu	Parameter	No	Menu	Parameter
1	**Alarm Level**	Full Scale Sensitivity ₩ Alert ₩ Action ₩ Fire 1 ₩ Fire 2 ₩ Sensitivity Threshold configuration	11	**Zone Relay Configuration**	Zone Relay 1 to 16 configuration **** Only for Quartas 2000s Model Scanner Function***
2	**Time Delay**	Alert ₩ Action ₩ Fire 1 ₩ Fire 2 ₩ Delay configuration	12	**Device Relay Test**	Relay 1 to 7 ₩ ALL
3	**Pipe Flow**	Pipe Used ₩ Pipe Flow High & Low ₩ Pipe Fan Speed ₩ Flow Sensitivity	13	**Zone Relay Test**	Zone Relay 1 to 16 ₩ ALL **** Only for Quartas 2000s Model Scanner Function***
4	**Normalize Flow**	Normalize ₩ Automatic Normalize	14	**Date and Time**	Year ₩ Month ₩ Date ₩ Hour ₩ Minute ₩ Second
5	**Alarm Action**	Cascade Alarm ₩ Alarm Latch ₩ Fault Latch ₩ Fault Delay	15	**System**	Address ₩ Facture Default ₩ Password ₩ Reference Detector Address ₩ Reference Zone ₩ Reference Delay
6	**Filter**	Filter Status ₩ Filter Due ₩ New Filter	16	**Log**	Smoke and Air Flow Enable ₩ Log Mode ₩ Change Rate
7	**Front Panel**	Button for Reset ₩ Isolate ₩ Silence ₩ Test and Buzzer configuration	17	**Scale**	Mean Period ₩ Sensitivity Mode 1 ₩ Sensitivity Mode 2
8	**Control**	Reset ₩ Isolate ₩ Silence ₩ Test	18	**SW Version**	Controller ₩ Display ₩ Serial No
9	**GPI**	GPI configuration	19	**Scan**	Scan Enable ₩ Scan Level ₩ Scan Time **** Only for Quartas 2000s Model Scanner Function***
10	**Device Relay Configuration**	Device Relay configuration	20	**Optional Module**	Zone Use ₩ Display Use ₩ Filter Use ₩ Smoke Sensor Use

MENU 01 – ALARM THRESHOLD LEVEL

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
1	Alarm Level	Full Scale Sensitivity	AF.	0.01	20.0	0.20	*The detector smoke level in %/m for the bargraph reaching its full scale (20 bars). The smaller the value, the higher the sensitivity is or vice versa.*
		Alert Bargraph Level	A1.	2	20	10	*The Alert "bargraph" level. When the alert bargraph level has been reached and the appropriate time delays have expired. The detector will generate Alert Alarm.* *The Alert Smoke Level (%/m) = Full Scale Level/20 x Alert Bargraph Level. For examples, by the default settings, the alert level is 0.2/20x10=0.1%/m.*
		Action Bargraph Level	A2.	3	20	15	*The Action "bargraph" level. When the action bargraph level has been reached and the appropriate time delays have expired. The detector will generate Action Alarm.* *The Action Smoke Level (%/m) = Full Scale Level/20 x Action Bargraph Level. For examples, by the default settings, the action level is 0.2/20x15=0.15%/m.*
		Fire 1 Bargraph Level	A3.	20	20	20	*The Fire 1 "bargraph" level. When the fire 1 bargraph level has been reached and the appropriate time delays have expired. The detector will generate Fire 1 Alarm. This setting is fixed to 20 and cannot be modified.*
		Fire 2 Level	A4.	0.10	20.0	2.00	*The Fire 2 "smoke" level in %/m. When the smoke level has been reached and the appropriate time delays have expired. The detector will generate Fire 2 Alarm.*

MENU 02 – ALARM DELAY

No	Menu	Parameter	LED Displa y	Min	Max	Default	Function / Description
2	Time Delay	Alert Delay	t1.	0	60	10	*The alarm delay is the number of seconds that an alarm level has to be continuously s ensed before the alarm is initiated. Each alarm level has a programmable delay of bet ween 0 and 60 seconds.*
		Action Delay	t2.	0	60	10	
		Fire 1 Delay	t3.	0	60	10	
		Fire 2 Delay	t4.	0	60	10	

MENU 03 – AIR FLOW

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
3	Pipe Flow	Pipe Used	U.	0	1	1	*Enable if the pipe is connected. It is used to enable or disable flow sensing on the specified pipe inlet of the detector. If any pipe inlets are unused, set the relevant flow sensor function for the pipe inlet to No to avoid unwanted flow faults.*
		Pipe Flow High	H.	101	200	120	*Flow high is the level above which airflow needs to increase to trigger a fault indication (which may indicate a loose or damaged inlet pipe)*
		Pipe Flow Low	L.	0	99	80	*Flow low is the level below which airflow needs to be reduced to trigger a fault reading (which may indicate a blocked pipe)*
		Pipe Fan Speed	F.	0	10	5	*The value entered sets the aspirator in the detector to one of a range of predetermined speeds. The lower the number entered the lower the airflow rate and the lower the power consumption.*
		Flow Sensitivity	S.	0	5	0	*The flow detection sensitivity increase with the set number.*

MENU 04 – NORMALIZE AIR FLOW

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
4	Normalize Flow	Normalize	NA.	N	Y	N	*Setting this function to Y puts the detector into automatic flow normalization process. This takes a few minutes to normalize the flow to 100% based on the current flow rates. During normalization, the green flow indicator (LED) on AVA Device display will flash or a normalize flow event will show on QUARTAS LCD display. After normalization, the flow reading greater than 100 means the current flow is bigger than normal condition, indicating a sign of pipe breakage. On the other hand, the flow reading less than 100 means the current flow is smaller than normal condition, indicating a sign of pipe or sampling port blockage.* *Note: It is crucial to make sure no breakage or blockage on the pipe before setting the device into normalization process. Otherwise the system will see the abnormal condition as a normal condition.*
		AutoNorm.	NF.	N	Y	Y	*Setting this function to Y will automatically go into normalization process when the device is powered on.*

MENU 05 – ALARM ACTION

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
5	Alarm Action	Cascade Alarm	CA.	N	Y	Y	*Setting this function to Y means that only when the detector's controller has gone into Alert does the controller start counting down the Action delay i.e. the time delays on Alert and Action are cumulative. So are the following Fire 1 and Fire 2 delays.* *There are chances that the higher level alarm goes off before the lower level alarm if the setting of higher level alarm time delay is less than the time delay of lower level alarm and the smoke level increase quickly. Enable cascade alarm will guarantee the alarms go off step by step.*
		Alarm Latch	AL.	N	Y	Y	*When this function is set to Y it requires a reset on the front panel or a remote reset to clear an alarm condition. This means the alarms must be confirmed and reset manually even if the smoke level is decreased below alarm level. This is the factory default setting. When this function is set to N, the alarm will be reset automatically when the smoke level is decreased below alarm threshold.*
		Fault Latch	FL.	N	Y	N	*When this function is set to Y it requires a reset from the front panel or a remote reset to clear fault indications. If this function is set to N, the fault will be reset automatically when the fault condition is cleared.*
		Fault Delay	Ft.	0	60	10	*The fault delay is the number of seconds that a fault condition has to be continuously sensed before the fault is initiated.*

MENU 06 – FILTER

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
6	Filter	Filter Status	FS.	0	100		*Read Only*
		Filter Due	Fd.	0	730		*Read Only*
		New Filter	FN.	OFF	ON	OFF	*Setting this function to Y to start a new filter life cycle when a new filter has been installed*

MENU 07 – FRONT PANEL CONTROL FUNCTION

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
7	Front Panel	Reset Button	dr.	N	Y	Y	*The front panel buttons may be enabled or disabled individually by setting these functions to Y or N.*
		Isolate Button	dI.	N	Y	Y	
		Silence Button	dS.	N	Y	Y	
		Test Button	dt.	N	Y	Y	
		Buzzer	db.	0	4	3	*The front panel buzzer has different mode when it is set to the following number:* *0: Disable the buzzer, no sound in case of alarm or fault.* *1: In alarm, the buzzer sounds one second in every 10 seconds. In fault, the buzzer will not sound.* *2: In alarm and fault, the buzzer sounds one second in every 10 seconds.* *3: In alarm, the buzzer sound consistently. In fault, the beeper sounds one second in every 10 seconds.* *4: In alarm and fault, the beeper sound consistently.*

MENU 08 – FRONT PANEL CONTROL FUNCTION

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
8	Control	RESET	Cr.	N	Y	N	*This has the same effect as pressing the **<RESET/ISOLATE/SILENCE/TEST>** buttons on the front panel.*
		ISOLATE	CI.	N	Y	N	
		SILENCE	CS.	N	Y	N	
		TEST	Ct.	N	Y	N	

MENU 09 – GENERAL PURPOSE INPUT

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
9	GPI	GPI-1	I1.	0	15	1	*Setting the GPI terminal to below functions:* *0: NOT USED* *1: RESET* *2: ISOLATE* *3: SILENCE* *4: TEST* *5: MAINS FAULT* *6: BATT. FAULT* *7: POWER FAULT* *8: SENSITVITY MODE 1* *9: SENSITIVITY MODE 2* *10: SCAN (QUARTAS-2000 Only)* *11: UDI-1* *12: UDI-2* *13: UDI-3* *14: UDI-4* *15: UDI-5*
		GPI-2	I2.	0	15	2	
		GPI-3	I3.	0	15	5	
		GPI-4	I4.	0	15	6	
		GPI-5	I5.	0	15	0	
		GPI-6	I6.	0	15	0	
		GPI-7	I7.	0	15	0	
		GPI-8	I8.	0	15	0	

MENU 10 – DEVICE RELAY CONFIGURATION

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
10	Device Relay Configuration	Relay 1	r1.	1	7	1	*This sets the termination board relays to below output:* *1: ISOLATE* *2: FAULT* *3: ALERT* *4: ACTION* *5: FIRE 1* *6: FIRE 2* *7: AUXILIARY* *Note: Relay 2 "FAULT" is Normally Closed the others are Normally Open.*
		Relay 2	r2.	2	2	2	
		Relay 3	r3.	1	7	3	
		Relay 4	r4.	1	7	4	
		Relay 5	r5.	1	7	5	
		Relay 6	r6.	1	7	6	
		Relay 7	r7.	1	7	7	

MENU 11 – ZONE RELAY CONFIGURATION

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
11	Zone Relay Configuration	Relay 1	01.	2	2	2	*Relay 1 to 4 is Zone 1 / Pipe 1 Output* *Relay 5 to 4 is Zone 8 / Pipe 2 Output* *Relay 9 to 12 is Zone 3 / Pipe 3 Output* *Relay 13 to 16 is Zone 4 / Pipe 4 Output* The Relay configuration is same as devices relay *1: ISOLATE 2: FAULT 3: ALERT* *4: ACTION 5: FIRE 1 6: FIRE 2* *7: AUXILIARY* *Note: Relay 1 / 5/ 9 / 13 "FAULT" is Normally Closed the others are Normally Open.*
		Relay 2	02.	1	7	3	
		Relay 3	03.	1	7	4	
		Relay 4	04.	1	7	5	
		Relay 5	05.	2	2	2	
		Relay 6	06.	1	7	3	
		Relay 7	07.	1	7	4	
		Relay 8	08.	1	7	5	
		Relay 9	09.	2	2	2	
		Relay 10	10.	1	7	3	
		Relay 11	11.	1	7	4	
		Relay 12	12.	1	7	5	
		Relay 13	13.	2	2	2	
		Relay 14	14.	1	7	3	
		Relay 15	15.	1	7	4	
		Relay 16	16.	1	7	5	

MENU 12 – DEVICE RELAY TEST

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
12	Device Relay Test	Relay 1	r1.	N	Y	N	*When the selected relay is set to Y or N, the relay will be activated or de-activated to check if the relay connected device action is correct. For example, If relay 5 is fire 1 and connected to fire alarm system. Setting relay 5 to Y should have proper indications on the fire alarm panel.* *Setting All (All Relays) to Y, all relays will be activated.*
		Relay 2	r2.	N	Y	N	
		Relay 3	r3.	N	Y	N	
		Relay 4	r4.	N	Y	N	
		Relay 5	r5.	N	Y	N	
		Relay 6	r6.	N	Y	N	
		Relay 7	r7.	N	Y	N	
		All	AL.	N	Y	N	

MENU 13 – ZONE RELAY TEST

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
13	Zone Relay TEST	Relay 1	01.	OFF	ON	OFF	*When the selected relay is set to OFF or ON, the relay will activated or de-activated to check if relay connected devices action is correct.*
		Relay 2	02.	OFF	ON	OFF	
		Relay 3	03.	OFF	ON	OFF	*For example, if relay 5 is fire 1, and connected to fire alarm system. Setting relay 5 to ON should transmit the signal to Fire Alarm Panel.*
		Relay 4	04.	OFF	ON	OFF	
		Relay 5	05.	OFF	ON	OFF	*Setting ALL (All Relays) to ON, all relays will be activated.*
		Relay 6	06.	OFF	ON	OFF	
		Relay 7	07.	OFF	ON	OFF	
		Relay 8	08.	OFF	ON	OFF	
		Relay 9	09.	OFF	ON	OFF	
		Relay 10	10.	OFF	ON	OFF	
		Relay 11	11.	OFF	ON	OFF	
		Relay 12	12.	OFF	ON	OFF	
		Relay 13	13.	OFF	ON	OFF	
		Relay 14	14.	OFF	ON	OFF	
		Relay 15	15.	OFF	ON	OFF	
		Relay 16	16.	OFF	ON	OFF	
		ALL	AL.	OFF	ON	OFF	

MENU 14 – DATE AND TIME

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
14	Date & Time	YYYY/Year	yy.	2000	2099	*2010*	*It is important that the time and date be set up correctly on the controller's internal calendar/clock because it uses this information to store events in the event log.*
		MM/Month	NN.	01	12	*05*	
		DD/Day	dd.	01	31	*18*	
		HH/Hour	HH.	01	23	*19*	
		MM/Minute	nn.	00	59	*36*	
		SS/Second	SS.	00	59	*0*	

MENU 15 – SYSTEM SETTING

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
15	System	Address	Ad.	1	250	*250*	*Setting the device RS485 address. An ASD must have a unique address on the network.*
		Factory Default	dF.	N	Y	*N*	*Setting the function to Y will restore the device to the factory default settings. However, the device address will not be affected to prevent from unwanted network error.*
		Password	PS.	N	Y	*Y*	*When this function is set to Y it requires a password to enter the Program Mode and has the right to change settings. Setting this function to N it requires no password to enter the Program Mode and can only view the settings.*
		Reference Detector Address	rA.	0	250	*0*	*Setting the reference detector address number between 1 and 250 to enable referencing. When this function is set to 0 the referencing is disabled.*
		Reference Zone	rP.	1	8	*1*	*The zone (detector) number of above reference detector address.*
		Reference Dilution	rd.	1	100	*100*	*The value set with this function is the percentage reference signal subtracted from the detector's signal, if a reference device has been allocated.*
		Reference Delay	rt.	0	100	*0*	*This value is the delay time (in seconds) between a buildup of pollution being seen by the reference (if used) and the pollution being seen by the detector.*

MENU 15 – LOGGING

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
16	Log	Smoke Log Enable	SN.	N	Y	*Y*	*Setting this function to Y enables the smoke/flow log. There are two selectable log modes, CHANGE and RATE. On AVA device, 0 is CHANGE and 1 is RATE. When the log mode "CHANGE" is selected the following change function sets the following change percentage of the detection full scale: 0.01 %, 0.05%, 0.1%, 0.2%, 0.5%, 1%, 2%, 5%* *When the log mode "RATE" is selected the following function sets the following log rate in seconds: 1, 10, 60, 300, 600, 1200, 1800, 3600* *Note: For the smoke change, the detection full scale is the bargraph full scale, which is the same as Fire 1 Level. For the flow change it's 200%, the maximum flow reading in percentage.*
		Smoke Log Mode	SL.	0	1	*0*	
		Smoke Change /Rate	SC. /St.	0.01/ 1	5/ 3600	*5/ 3600*	
		Flow Log Enable	FN.	N	Y	*Y*	
		Flow Log Mode	FL.	0	1	*0*	
		Flow Chang/Rate	FC. /Ft.	0.01/ 1	5/ 3600	*5/ 3600*	

MENU 17 – SCALE

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
17	Scale	Mean Period	rt.	15	480	*60*	*This value is the period used to calculate the mean of smoke background level in this period. The mean period is selectable between the following values in minute: 15, 60, 12, 240, 480*
		Sensitivity Mode 1	S1.	0.1	10.0	*1.0*	*Setting this function to increase or decrease the smoke detection sensitivity by multiple this value to the original smoke alarm thresholds when relevant GPI is activated. This setting must work with the GPI which is set to Sensitivity Mode 1 or 2. If this function value is set to be greater than 1.0, the smoke detection becomes more sensitive. On the other hand, it becomes less sensitive if this function value is set to less than 1.0 .* *This function is usually used when different smoke detection sensitivity is required in certain situations. For example, in work hours the smoke background level increases due to all kinds of production activities. It may be desirable to have lower sensitivity in work hours and have higher sensitivity in non-working hours. Or when there're pollutants outside the detection zone causing false alarms, it can be solved by decrease the sensitivity by using another AVA device to detect the pollutant level and connect its relay to the GPI of the AVA device in the detection zone.*
		Sensitivity Mode 2	S2.	0.1	10.0	1.0	

MENU 18 – SOFTWARE VERSION

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
18	SW Version.	Controller	SC.				*Read Only*
		Display	Sd.				*Read Only*
		Serial No.	SN.				*Read Only*

MENU 19 – SCAN SETTING

No	Menu	Parameter	LED Displa y	Min	Max	Default	Function / Description
19	Scan	Scan Enable	SE.	0	1	0	*Enable Quartas 2000s Pipe Scan Function*
		Scan Level	SL.	1	4	3	*The alarm level reached to start pipe scan process to identify the pipe with most smo ke. 0=Manual Only, 1=Alert, 2=Action, 3=Fire 1, 4=Fire 2*
		Scan Time	St.	5	60	20	*The time in seconds for the aspirator operate on each pipe.*

MENU 20 – OPTIONAL MODULE

No	Menu	Parameter	LED Display	Min	Max	Default	Function / Description
20	Optional Module	Zone Used	OP.	OFF	ON	ON	*Enable/Disable Zone*
		Display Used	Od.	OFF	ON	ON	*Enable/Disable Display/Programmer*
		Filter Used	OF.	OFF	ON	OFF	*Enable/Disable Filter*
		Sensor Used	OS.	OFF	ON	OFF	*Enable/Disable optional Sensor Board*
		Zone Relay Used	Or	OFF	ON	OFF	Enable / Disable Optional Zone Relay Board (Not for Q-500s)

AVA PREVENT
Aspirating Cabinet Smoke Detection

MAINTENANCE

MAINTENANCE

Aspirating smoke detector is a very low maintenance detection system.

- Cleaning of ASD Housing
  - Performed using a damp (not wet) cloth.
  - Do not use solvents as these may mar the display.

- Replacement of Dust filter.
  - The filter condition can be checked from the Status Screen of the Numerical LED Display, which gives a percentage reading of filter efficiency and the dust filter expired due date.
  - ASD will signal when filter level drops to 70% of the efficiency level.

MAINTENANCE

Time / Content	Monthly	Quarterly	Every 6 months	Every year	Every two years
UPS Power Supply	•	•	•	•	•
Display	•	•	•	•	•
Air Flow	•	•	•	•	•
End Cap Flow Test		•	•	•	•
Sampling pipes Inspection			•	•	•
Signaling inspection				•	•
Clean sampling pipework					•

PREVENTIVE MAINTENANCE

Check UPS Power Supply

- Check the DC input voltage using multi-meter to make sure the power is within normal range of 21.6 to 26.4 VDC
- Disconnect AC Power to check AC – Battery function correctly. Check Fire Alarm Panel and UPS Power Supply display any Main AC Fail.
- Disconnect wiring from Backup Battery (Normally black cable), Check Fire Alarm Panel and UPS Power Supply display any Battery Fail.
- Every half year shall discharge the UPS battery current and check UPS charging function.

Check the ASD Device Display

- Press the <Test> button (if it's enabled) to check if all the LEDs and LCD screen on the display illuminates normally.

Check the Sampling Tube Network Air Flow

- With ASD Device front panel display or AVANet Management System computer software to check and record the airflow readings.
- Compare the reading to history record to see if there's significant change. Airflow reading during maintenance should be confirmed as ± 20% of the values measured at commissioning
- Inspect the sampling pipe to see if there is pipe breakage or hole blockage if there's significant change in readings.

PREVENTIVE MAINTENANCE

End Cap Smoke Test

- Introduce smoke to the furthest sampling hole at the end.
- Check the response time is within specification (typically 120 seconds) and compare this to history record. Measurements of transport time from the furthest sampling hole during maintenance should be confirmed to be within ± 15% or ± 3 seconds, which ever is the greater, of the same measurement taken at commissioning.
- Inspect the pipework if there's significant change in the response time.

Sampling Pipes Inspection

- Check there's no obstructions to sampling pipework, sampling points and/or remote capillaries.
- Visual check there's no pipe breakage or sampling point blockage.
- Check the End cap to see whether it is intact.
- Check the capillary tube if it is loosed from the connector of the remote sampling point.

PREVENTIVE MAINTENANCE

Signalling Inspection

- To verify the connections between ASD and other connected systems (e.g. CIE, BMS).
- Activate the fire relays in the relay test menu or supply smoke to put the detector until the detector goes into alarm stage. Check if there's associate alarm generated on the fire alarm panel if it's connected to the fire alarm system.
- Activate the fault relay in the relay test menu or put the detector into fault (e.g. pull out the sampling pipe to generate flow fault) to check if there's associate fault generated on the fire alarm panel if it's connected to the fire alarm system.
- Shut down the power supply mains power. Check if the power supply back up output and its display function correctly. Check if there's relevant fault generated on ASD if the mains or power fault monitoring GPI is connected. Check if there's relevant fault generated on fire alarm panel if the fault relay is connected to fire alarm system.
- Disconnect the negative wire (black) of the power supply batteries. Check if the power supply and its display function correctly. Check if there's relevant fault generated on ASD if the battery or power fault GPI is connected.

PREVENTIVE MAINTENANCE

Clean the sampling pipe work

- The sampling point can be cleaned with a compress air or using a proper tool to remove the dust build up on the sampling hole.
- To clean the capillary tube, it can be removed from the pipe and use compressed air to blow the dust away.
- To clean the whole sampling pipework system, a sampling pipe must be removed from the pipe inlet and introduce high airflow providing by a compressor into the sampling pipe to blow off the dust in the pipework and the sampling holes. Alternatively, to ease the maintenance, a three ways valve can be installed before the pipe inlet so that a maintenance inlet is provided on the three ways valve. In normal operation, the valve is switched to connect the sampling pipe and the detector pipe inlet. In maintenance occasion, it is switched to connect the sampling pipe and the maintenance inlet so that the high airflow can be introduced to the maintenance inlet directly.