VESDA VLI Product Guide

VLI-880

VLI-885

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If any provision outlined above is found to be invalid or unenforceable by a court of law, such invalidity or unenforceability will not affect the remainder which will continue in full force and effect. All rights not expressly granted are reserved.

Scope

The VESDA VLI Product Guide provides a comprehensive description of the VLI detector and its accessories.

This guide introduces the VLI features, technical specifications and gives an understanding of its components and their function. You will also find instructions on installing, cabling and powering up the detector.

This guide is for anyone involved with the design, maintenance and purchasing of a VESDA system. It is assumed that anyone using this product has the knowledge and appropriate certification from local fire and electrical authorities.

Document Conventions

The following typographic conventions are used in this document:

Convention	Description
Bold	**Used to denote:** emphasis. Used for names of menus, menu options, toolbar buttons.
Italics	**Used to denote:** references to other parts of this document or other documents. Used for the result of an action.

The following icons are used in this document:

Convention	Description
	**Caution:** This icon is used to indicate that there is a danger to equipment. The danger could be loss of data, physical damage, or permanent corruption of configuration details.
	**Warning:** This icon is used to indicate that there is a danger of electric shock. This may lead to death or permanent injury.
	**Warning:** This icon is used to indicate that there is a danger of inhaling dangerous substances. This may lead to death or permanent injury.

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Codes and Standards Information for Air Sampling Smoke Detection

We strongly recommend that this document is read in conjunction with the appropriate local codes and standards for smoke detection and electrical connections. This document contains generic product information and some sections may not comply with all local codes and standards. In these cases, the local codes and standards must take precedence. The information below was correct at time of printing but may now be out of date, check with your local codes, standards and listings for the current restrictions.

FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, the user is encouraged to try to correct the interference by one or more of the following measures; re-orientate or relocate the receiving antenna, increase the separation between the equipment and receiver, connect the equipment to a power outlet which is on a different power circuit to the receiver or consult the dealer or an experienced radio/television technician for help.

FDA

This Xtralis product incorporates a laser device and is classified as a Class 1 laser product that complies with FDA regulations 21 CFR 1040.10. The laser is housed in a sealed detector chamber and contains no serviceable parts. The laser emits invisible light and can be hazardous if viewed with the naked eye. Under no circumstances should the detector chamber be opened.

FM Hazardous Applications

Product is suitable for Class I, Division 2, Group A, B, C and D Hazardous (Classified) Locations. 3611 Hazardous Approval Warning: Exposure to some chemicals may degrade the sealing of relays used on the detector. Relays used on the detector are marked “TX2-5V”, “G6S-2-5V” or “EC2-5NU”.

EXPLOSION HAZARD. DO NOT DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

VESDA detectors must not be connected or disconnected to a PC while the equipment is powered in an FM Division 2 hazardous (classified) location (defined by FM 3611).

FM Approved Applications

The product must be powered from VPS-100US-120 or VPS-100US-220 only.

AS 7240.20

The performance of this product is dependent upon the configuration of the pipe network. Any extensions or modifications to the pipe network may cause the product to stop working correctly. You must check that ASPIRE approves alterations before making any changes. ASPIRE is available from your authorized representative.

AS1851.1 2005

Maintenance Standards. Wherever this document and the AS1851.1 differ, AS1851.1 should be followed in preference to this document.

Regional Regulatory Requirements and Notices

UL

For open area protection the fire alarm threshold (signal) that initiates an evacuation procedure via the Fire Alarm Panel must not be set less sensitive than 0.625%/ft. The detector can send this signal via the Fire Alarm Panel Output signal or the Pre-alarm output signal.

Through validation testing, Underwriters Laboratories Inc. has verified that VESDA ECO gas detectors, when installed within the sample pipe network, present no significant effects on the smoke detection performance of VESDA. The use of the ASPIRE calculation software is required to verify system design performance with all devices included in the design.

EN 54-20

The product must use a power supply conforming to EN 54-4.

The product is compliant with EN 54-20 sensitivity requirements provided the following conditions are met:

- For a Class A detector, hole sensitivity must be better than 1.5% obscuration/m and transport time less than 60 seconds
- For a Class B detector, hole sensitivity must be better than 4.5% obscuration/m and transport time less than 90 seconds
- For a Class C detector, hole sensitivity must be better than 10% obscuration/m and transport time less than 120 seconds

These limits should be verified using ASPIRE during the design of the sampling pipe network.

The product is compliant with EN 54-20 flow monitoring requirements provided the following conditions are met:

- The minor low and minor high flow thresholds should be set at 85% and 115% respectively
- The airflow delay setting must be less than 120 seconds.

Additional information:

VESDA VLI was successfully tested and passed the EN 54-20 fire tests with the following configurations:

- Class C with 64 holes and a Fire-1 setting of 0.15% obscuration/m
- Class B with 28 holes and a Fire 1 setting of 0.15% obscuration/m
- Class A with 24 holes and an Alert setting of 0.06% obscuration/m

Note: These configurations were chosen to illustrate the maximum capability of the VESDA VLI in terms of number of holes and sensitivity in a clean environment and necessitated the use of holes with a diameter less than 3mm. As stated in Section 4.1, for industrial applications with high background levels, hole sizes of less than 3mm should be avoided. Thus, the maximum number of holes may not be realizable in some applications.

In all applications an ASPIRE design must be prepared to meet appropriate EN54-20 sensitivity transport time targets, taking into consideration all factors including any local codes and standards for maximum transport times.

UK CA 0359 21	CE 0786 19
Xtralis Pty Ltd. 4 North Drive, Virginia Park 236-262 East Boundary Road Bentleigh East Victoria, 3165, Australia **CE/UKCA DoP: 25988**	
EN 54-20: 2006 Aspirating smoke detectors for fire detection and fire alarm systems for buildings Classes: A, B and C	

Product Listings

- UL
- ULC
- FM
- ActivFire
- CE
- UKCA
- LPCB
- VdS
- NF
- VNIIPO
- EN 54-20

Regional approvals listings and regulatory compliance vary between product models. Refer to www.xtralis.com for the latest product approvals matrix.

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Table of Contents

1 Introduction

The VESDA VLI is an aspirating smoke detector (ASD) that provides very early warning of fire conditions by drawing air samples through an air sampling pipe network.

The VLI detector is especially designed to operate in industrial applications under harsh and dirty environments. It incorporates features that specifically address the common challenges of industrial installations, including:

- high background levels of airborne particles
- the need for environmental enclosures
- detector longevity
- the need for on-site maintenance

Figure 1-1: VESDA VLI Aspirating Smoke Detector

The detector easily interfaces with fire warning and fire suppression release systems, and can be integrated into a building management system (BMS).

1.1 Features

The VLI detector contains the following features:

- Area coverage up to 2000m² (21,520ft²)
- Up to four inlet pipes
- Total pipe length of 360m (1181ft)
- Five high intensity status LEDs
- Robust absolute smoke detection
- Patented Intelligent Filter
- Inertial separator (sub sampling probe)
- Lint trap to capture fibrous particles
- Secondary Foam Filter
- Clean air barrier for optics protection
- Referencing (on VESDAnet enabled model)
- AutoLearn™ Smoke and Flow
- Clean Air Zero™
- Air-path monitoring
- Five relays (fire, fault and three configurable) configurable as latching or non-latching
- One (standard) or two GPIs (VESDAnet enabled model)
- Ultrasonic flow sensing
- Xtralis VSC, Xtralis VSM4 and ASPIRE software support

- IP66 enclosure
- Easy mounting with steel support bracket
- Modular field replaceable parts for ease of servicing
- Replaceable aspirator, detection chamber and filters
- Local USB configuration port
- Easy cable termination access
- Imperial and metric pipe ports
- Rubberized finish to external housing

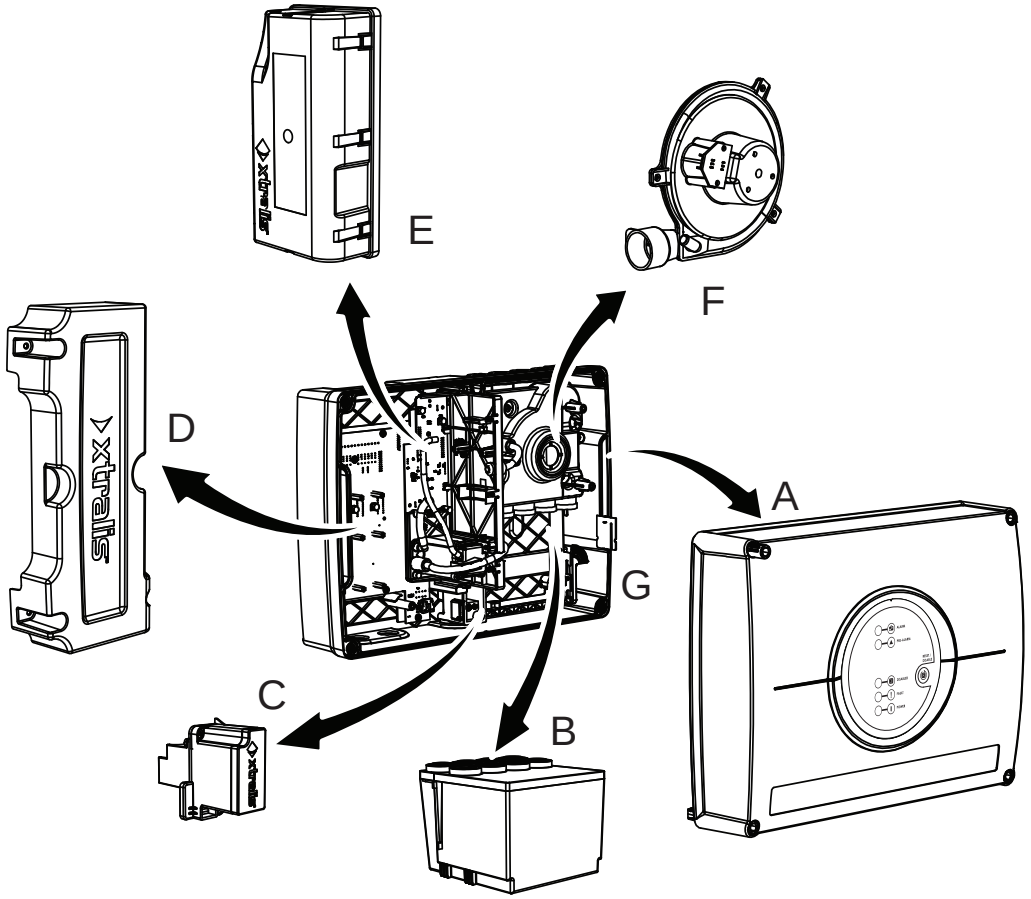
1.1.1 Intelligent Filter

The Intelligent Filter is fully monitored, fail-safe, and provides consistent sensitivity over the entire life of the detector. The filter significantly reduces the exposure of the internals of the detector to contaminants in the incoming air while providing consistent sensitivity to smoke. Refer to Section 2.2 for further information.

2 Product Information

2.1 Detector Components

The VLI detector contains a number of field-replaceable components.



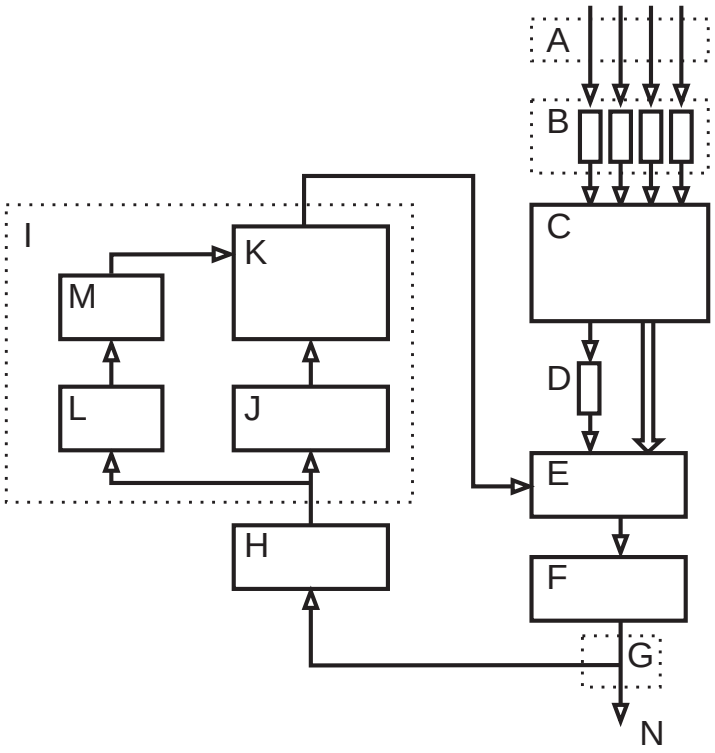
Legend			
A	Front cover	**E**	Chamber assembly with tertiary clean air filter
B	Intelligent Filter	**F**	Aspirator
C	Secondary Foam Filter	**G**	Base
D	Electrostatic Discharge (ESD) Cover		

Figure 2-1: Detector components

Refer to Chapter 7 for further information regarding maintenance scheduling and availability of spare parts.

2.2 How the VLI works

The VLI detector continually samples air from the protected environment via a sampling pipe network (A). Upon entering the detector, the air passes four sets of ultrasonic flow sensors (B), then through the mixer compartment of the Intelligent Filter (C), where it is split between two pathways. One pathway carries the majority of the air through a HEPA filter, while the other carries a small proportion of the air through a separate set of ultrasonic flow sensors (D). The air then recombines in the main aspirator (F).



Legend	
A	Pipe Inlets
B	Ultrasonic Flow Sensors
C	Intelligent Filter
D	Ultrasonic Flow Sensor
E	Manifold
F	Main Aspirator
G	Sampling Probe
H	Secondary Foam Filter
I	Chamber Assembly
J	Chamber Flow Sensor
K	Chamber
L	Tertiary Clean Air Filter
M	Clean Air Zero Aspirator
N	Exhaust

Figure 2-2: Internal airflow example

Note: The Intelligent Filter loading is constantly monitored using the ultrasonic flow sensors in the unfiltered path (D). Coupled with the arrangement of the four sets of ultrasonic flow sensors at the detector air inlets (B), the detector measures the split of the airflow ratio as the filter loading increases. The detector maintains the sensitivity depending on the flow ratio, thus ensuring consistent and reliable operation over time.

A portion of recombined air sample is then passed through the sub-sampling probe (inertial separator) and secondary foam filter (H). Larger dust particles are unable pass through the probe and filter arrangement and hence are exhausted out of the detector (N). This eliminates nuisance alarms caused by larger dust particles and extends the life of the detection chamber (K). The tertiary clean air filter (L) provides clean air to form the clean air barriers within the detection chamber (K), which protects the optical surfaces from contamination.

The presence of smoke in the detection chamber (K) creates light scattering which is detected by the sensor circuitry. The air sample is measured, and the detector reports smoke levels in line with the sensitivity ratio determined by the Flow Sensors (B and D). Air is exhausted from the detector and may be vented back into the protected area (N).

Note: The status of the detector, all alarms, service and fault events, are monitored and logged with time and date stamps. Status reporting can be transmitted via relay outputs and across VESDAnet (VESDAnet version only).

2.2.1 Clean Air Zero

Clean Air Zero is a user-initiated feature which is primarily intended to safeguard against nuisance alarms. This is achieved by introducing clean air into the detection chamber and taking a reference reading. This reading is then offset against the actual environmental background to maintain consistent absolute smoke detection.

The user can initiate the Clean Air Zero process using Xtralis VSC. It takes up to 60 seconds to complete, during which time the detector is offline.

Clean Air Zero Process

When the user initiates the Clean Air Zero process from within the Xtralis VSC software, the following actions occur:

1. The main aspirator is turned off.
2. The Clean Air Zero aspirator located inside the chamber assembly is turned on. This aspirator pumps clean air into the Chamber and removes any contaminated air.
3. After a waiting period, a smoke reading is taken with clean air in the chamber. This reading is the new clean air background value and is used as a reference point against the actual environmental background.
4. The Clean Air Zero aspirator is turned off and the main aspirator is turned back on.
5. An event indicating that the Clean Air Zero process has taken place is added to the event log.

2.3 Front Panel

The VLI detector provides the following information and control capability:

- **Status LEDs:** Alarm, Pre-Alarm, Disabled, Fault and Power.
- **Controls:** Reset and Disable button.

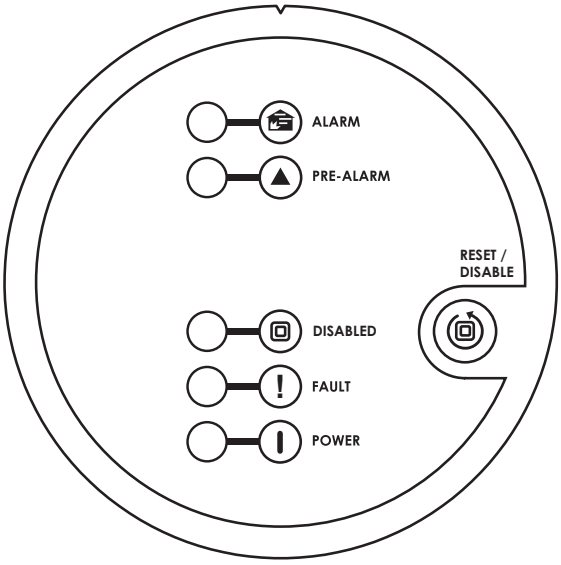


Figure 2-3: Front Panel Controls and LEDs

Status LEDs

Table 2-1: LED Indicators

LED	Description
Alarm	The ALARM LED is lit when the Fire1 Alarm threshold is reached.
Pre-Alarm	The PRE-ALARM LED blinks when the Alert threshold is reached. The PRE-ALARM LED is lit when the Action threshold is reached.
Disabled	The DISABLED LED is lit when the detector is disabled.
Fault	The FAULT LED is lit when a fault condition is detected. Refer to Chapter 8 for information on troubleshooting.
Power	The POWER LED illuminates when the detector is powered up.

Notes:

- The LEDs are tested during the power up cycle. To manually test the LEDs, run the Lamp Test using Xtralis VSC.
- Power and Fault LEDs are also present on the main board inside the VLI for when the front panel is disconnected during installation or maintenance.

RESET / DISABLE Button

Resetting the detector unlatches all latched alarms and faults, returns relays to their normal state and clears the active event list.

- To reset the detector, press this button once.

Disabling the detector disables all the output relays associated with the detector. The aspirator remains active.

- To disable the detector, press and hold the button for approximately 2 seconds, until the DISABLED LED illuminates.
- To re-enable the unit, press and hold the button for approximately 2 seconds, until the DISABLED LED deactivates.
- While the detector is disabled, any faults may be cleared by pressing this button once.

The button will not operate if:

- the detector is disabled through the GPI function; or
- the RESET / DISABLE button has been locked out in the programming.

2.4 Communication Ports

The majority of user operations are performed using software installed on a computer connected to the detector via one of the communication ports.

The communication ports are located on the main board inside the detector. It is necessary to remove the front cover from the detector in order access these ports. Refer to Section 1.1 for the front cover removal procedure.

Warning: EXPLOSION HAZARD. DO NOT DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

Avertissement : RISQUE D'EXPLOSION. Ne pas déconnecter l'équipement en présence d' UN COMBUSTIBLE ou d'une ATMOSPHÈRE inflammable.

USB

The USB port is used for configuration purposes. It allows direct connection between the VLI detector and a PC or laptop installed with Xtralis VSC.

Refer to Section 3.2.3 for information on connecting the USB lead, and Section 5.1 for information on creating connection profiles in Xtralis VSC.

Note: The USB port should not be used for continuous monitoring with the Xtralis VSM4 software. Monitoring should be performed using a connection made via the Ethernet port.

Ethernet

The Ethernet port is used for configuration and/or monitoring purposes. It enables direct or routed TCP/IP network connection between the detector and a PC or laptop installed with Xtralis VSC.

Refer to Section 3.2.3 for information on connecting the Ethernet lead, and Section 5.1 for information on creating connection profiles in Xtralis VSC.

RS485

The RS485 port is present on the VESDAnet Card of the VESDAnet enabled model, and can be used for configuration of any device on the VESDAnet. It provides connectivity for the handheld LCD Programmer or a local PC or laptop via a High Level Interface (HLI). Refer to Section 1.0.1 for further information on the LCD Programmer.

2.5 Specifications

Table 2-2: VLI Detector Specifications

Specification	Value
Supply Voltage	18 to 30 VDC
Power Consumption @24 VDC	• **Normal:** 9.6W • **Alarm on:** 10.8W
Current Consumption	• **Normal:** 415mA • **Alarm on:** 440mA
Dimensions (WHD)	426.5mm x 316.5mm x 180mm (16.8 in x 12.5in x 7.1in)
Weight	6.035 Kg (13.3Lbs)
Operating Conditions (To operate the VESDA VLI detector outside these parameters please contact your nearest Xtralis Office)	**Temperature:** • **Ambient:** 0° to 40°C (32° F to 104°F) • **Tested:** -10° to 55°C (14°F to 131°F) • **Sampled Air:** -20° to 60°C (-4° to 140°F) **Humidity:** • 10-95% RH, non-condensing
Storage Conditions (Non-operational)	• **Battery life:** Up to 2 years • **Humidity:** Dry (<95%) • **Temperature:** 0° to 85°C • Must not be exposed to sunlight or other radiation sources
Sampling Pipe Network	• **Maximum length per single straight pipe:** 120 m (394 ft) • **Total pipe length:** 360 m (1181 ft) • **Pipe Modeling Design Tool:** ASPIRE • **Minimum total airflow:** 40 l/m • **Minimum airflow per pipe:** 20 l/m
Pipe Size	• **Internal Diameter:** 15-21 mm (0.874 inch) • **External Diameter:** 25 mm (1.05 inch)
Relays	• 5 relays - Fire, Fault, 3 x Configurable. • Contacts rated 2A @ 30 VDC. • Programmable to latch or non-latch states • Programmable 0 - 60 sec delay for each relay
IP Rating	IP66 • protection against ingress of any dust • protection against powerful water jets
Mounting	Upright or inverted with supplied mounting bracket
Cable Access	4 plastic plugs (2 top, 2 bottom), 25.4mm (1 inch) diameter. **Note:** To maintain the IP rating, IP66 compliant cable glands must be used.
Cable Termination	Screw terminal blocks (0.2-2.5 sq mm, 30-12 AWG)
Interfaces	• USB (Type 2) • Ethernet (RJ45) • RS485 (VESDAnet enabled detectors)
Sensitivity Range	0.005 to 20.00% obs/m (0.0015 to 6.25% obs/ft.)

Table 2-2: VLI Detector Specifications (continued...)

Specification	Value
Threshold Setting Range	• **Alert:** 0.05%–1.990% obs/m (0.016% - 0.6218% obs/ft) • **Action:** 0.1%–1.995% obs/m (0.031% - 0.6234% obs/ft) • **Fire1:** 0.15 %–2.0% obs/m (0.047% - 0.625% obs/ft) • **Fire2:** 0.155 %–20.0% obs/m** (0.05% - 6.25% obs/ft) ** Limited to 12% obs/m (4% obs/ft.) in UL mode
Referencing	Reference smoke level source for the VESDAnet enabled model.

Notes:

Ensure that UL Mode is switched ON to maintain the UL listing.

- UL Mode = ON: Fire2 set to 12% obs/m (4% obs/ft.) to comply with UL268
- UL Mode = OFF: Fire2 threshold can be set up to 20% obs/m (6.4%/ft)

Table 2-3: Key Software Features

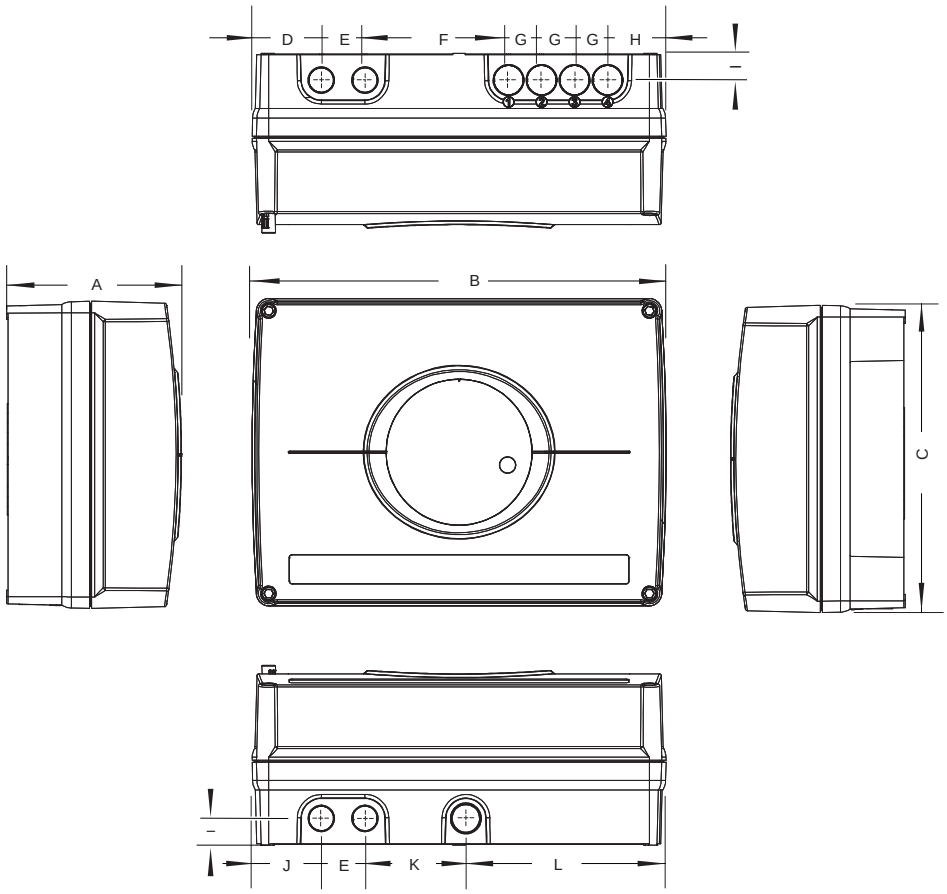
Event Log	Up to 18,000 events stored on FIFO basis
AutoLearn	• Minimum 15 minutes • Maximum 15 days, 23 hrs, 59 minutes • Recommended minimum period: 1 day Thresholds are automatically changed from the previously set values to the updated values after the AutoLearn process has completed.
Referencing	Adjustment for external ambient conditions
Four Alarm Levels	Alert, Action (PRE-ALARM), Fire1 (ALARM) and Fire2
Two Fault Warning Levels	Minor Fault and Urgent Fault
Maintenance Aids	• Filter and flow monitoring • Event reporting via VESDAnet and event log

Table 2-4: Ordering Information

VESDA VLI Standalone	VLI-880
VESDA VLI with VESDAnet Card	VLI-885
VESDA VLI Remote Display with RTC7	VRT-Q00
VESDA VLI Remote Display with RTC0	VRT-T00
LCD Programmer	VRT-100
Hand-held LCD Programmer	VHH-100

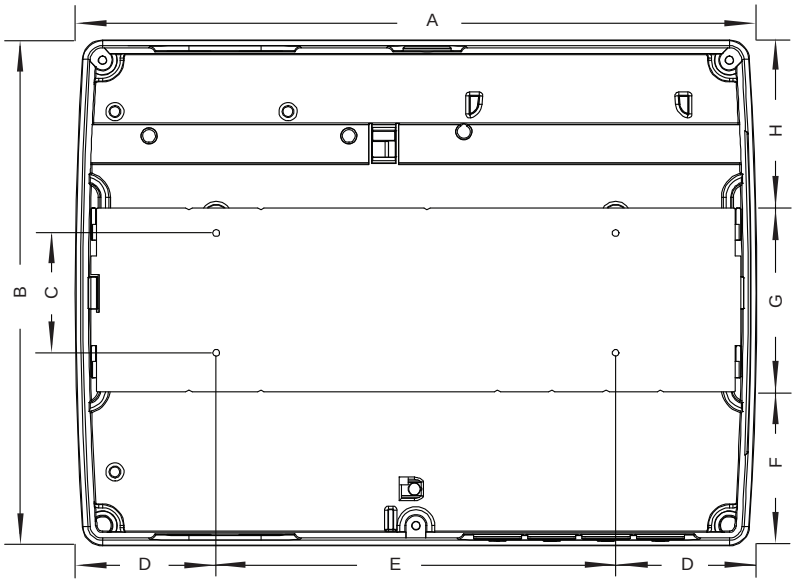
Note: Refer to Section 7.7 for the spare parts list.

2.6 Dimensions



	mm	inch
A	180	7.08
B	426.5	16.8
C	316.5	12.46
D	70.2	2.76
E	45	1.77
F	149	5.87
G	34	1.34
H	60.3	2.37
I	26.7	1.05
J	70.2	2.76
K	105	4.13
L	206.3	8.11

Figure 2-4: Front Dimensions



	mm	inch
A	426.5	16.8
B	316.5	12.46
C	75	2.95
D	88.25	3.47
E	250	9.84
F	96.3	3.8
G	115.2	4.54
H	105	4.13

Figure 2-5: Rear Dimensions

2.7 VESDAnet

VESDAnet is a proprietary communications protocol which is used on a network that connects the VESDA range of smoke detectors, displays, programmers and remote units and enables them to communicate on a VESDAnet network.

A VESDAnet network allows:

- configuration and monitoring of devices from a central computer.
- connection to a reference detector.
- connection to additional accessories such as remote displays.

The VESDAnet enabled VLI detector (VLI-885) can be joined to a VESDAnet network, and provides a connection point on the VESDAnet for a High Level Interface (HLI), which is required to connect a PC or laptop to the VESDAnet. Alternately, the connection point can be used for a hand-held LCD Programmer (refer to Section 2.8.2). The VLI-885 also contains a socket on the VESDAnet card for monitored General Purpose Input (refer to Section 1.0.1).

Refer to the VESDA Communications Guide for further information on VESDAnet network connectivity.

2.8 Accessories

A range of optional accessories are available to augment the VESDAnet-enabled VLI-885 detector.

2.8.1 Remote Display Module

The Remote Display Module provides real-time indication of the status of a VLI detector and a single zone.

Figure 2-6: Remote Display Module

The unit contains a 20-segment vertical bar graph display, a 2 digit numeric display, an audible sounder, clear alarm and fault indicators, and can be mounted in a remote mounting box or 19 inch subrack.

- Smoke levels are continuously shown on the bar graph display where each illuminated segment indicates the current level of detected smoke.
- The top segment of the bar graph indicates the Fire1 smoke threshold level and each segment below that level represents 1/20 of the Fire1 smoke threshold level.
- The Alert, Action and Fire1 smoke threshold indicators provide a visual representation of the programmable alarm thresholds, showing how close the smoke level is to triggering the next level of alarm.
- Fault conditions are indicated by a series of LEDs and an audible tone.
- The numerical readout can show either the current smoke level in % obscuration/m (% obscuration/ft) or the Fire1 threshold in % obscuration/m (% obscuration/ft).
- Four buttons enable users to reset, isolate or silence the detector and control the mode of the remote display module. These buttons can be locked out.

2.8.2 LCD Programmer

The VESDA LCD Programmer is used for configuring, commissioning and maintenance of the devices on VESDAnet. It is connected via VESDAnet and can be mounted at a remote location.

A hand-held model (VHH-100) is also available. This model is connected to the DB15 socket in the VLI-885 detector or other VESDAnet-enabled detectors.

Warning: EXPLOSION HAZARD. DO NOT DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

Avertissement : RISQUE D'EXPLOSION. Ne pas déconnecter l'équipement en présence d' UN COMBUSTIBLE ou d'une ATMOSPHÈRE inflammable.

Legend	
A	LCD Display
B	Keys

Figure 2-7: Hand-held LCD Programmer

Refer to the LCD Programmer Product Guide for further details.

3 Installation

The VLI detector is shipped with the following components:

- 1 VLI detector
- 1 Mounting bracket
- 1 Ferrite core for connection using Ethernet cable
- Multilingual Installation Sheet
- 1 End of Line resistor with the VLI-885 detector

Check all components for damage and refer any concerns to your authorized representative.

Depending on the nature of the installation, it may be necessary to procure the following items:

- Screws and inserts for the mounting bracket that are appropriate for the installation location.
- Type A to Type B USB Interface Lead, if configuration of the detector is to be done via the USB interface.
- Standard Ethernet cable if configuration of the detector is to be done via the Ethernet interface.
- A High Level Interface (HLI), where it is necessary to connect to a VESDA VLI on VESDAnet.

Figure 3-1: Type A to Type B USB Interface Lead

3.1 Mounting

The VLI detector can be mounted in an upright or inverted position. Do not mount the detector with a sideways orientation as shown in Figure 3-2 below.

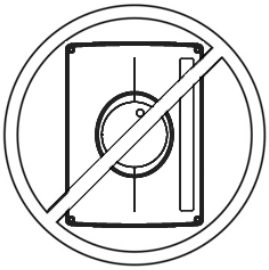
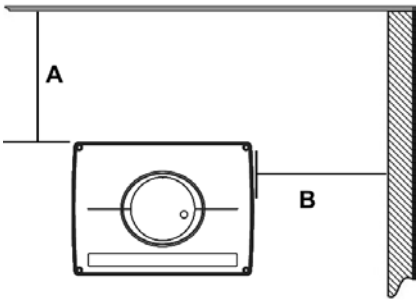


Figure 3-2: Sideways orientation

Ensure the mounting surface is flat as this allows an air tight seal to be achieved between the sampling pipe and the tapered air inlet pipes on the detector.

Ensure that there is sufficient clearance to mount the detector (Figure 3-3), noting the location of air sampling pipes and cable entry points. Due to the rigid nature of the plastic pipe, installation must provide for sufficient movement in all pipework (air inlet, air exhaust and cable pipes) to allow pipe ends to be easily fitted and removed.

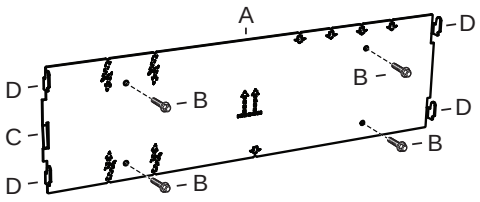


Legend	
A	Min. 200 mm (8 in.) below ceiling level
B	Min. 125 mm (5 in.) from a wall or obstruction

Figure 3-3: Mounting location

Mount the Detector

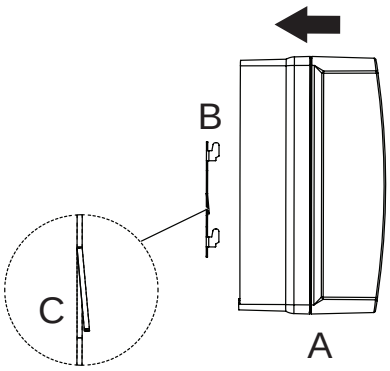
1. Horizontally align the mounting bracket (A) and place the flat side flush against the surface. Use appropriate fasteners (B) to secure the bracket.



Legend	
A	Mounting bracket
B	Fasteners
C	Locking Mechanism
D	Hooks

Figure 3-4: Mounting Bracket

2. Ensure that the locking mechanism (C) is bent outwards, as shown below in Figure 3-5.
3. Place the four slots located at the rear of the detector onto the hooks (D) of the mounting bracket.
4. Slide the unit downwards onto the hooks (D) until the locking mechanism (C) clicks.



Legend	
A	Detector
B	Mounting bracket
C	Locking Mechanism

Figure 3-5: Mounting the detector

3.2 Wiring

The screw type terminals located on electrical terminals within the VLI detector will accept wire sizes from 0.2 mm² to 2.5 mm² (30 – 12 AWG).

Refer to Codes and Standards Information for Air Sampling Smoke Detection on page iii for code specific requirements.

Refer to the VESDA System Design Manual for cabling details.

Warning: EXPLOSION HAZARD. DO NOT DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

Avertissement : RISQUE D'EXPLOSION. Ne pas déconnecter l'équipement en présence d' UN COMBUSTIBLE ou d'une ATMOSPHÈRE inflammable.

Note: The VLI detector is IP66 rated, therefore an IP66 compliant cable gland must be used to maintain the IP66 rating.

Caution: Electrostatic discharge (ESD) precautions need to be taken prior to removing the front cover from the detector in order to prevent damage to sensitive electronic components within the VLI.

Attention : Des précautions quant aux problèmes d'électricité statique doivent être prises avant de déposer la face avant du détecteur, pour éviter tout endommagement des composants électriques du VLI.

3.2.1 Cabling Inlets

The VESDA VLI contains four inlets for power, relay and network cabling, located on the upper and lower sides of the detector base. The holes have a diameter of 25.4mm (1 inch).

Note: To maintain the specified IP rating, IP66-compliant cable glands must be used.

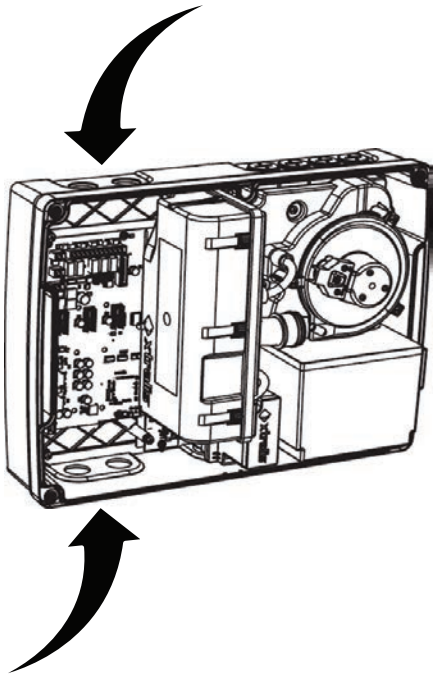


Figure 3-6: Cabling Inlets

3.2.2 Power Source

There are two sets of power terminals on the main board. Connect to a 24 VDC power supply to the PWR IN socket, and if required loop out to another detector via the PWR OUT socket.

The detector will not operate if the power supply polarity is reversed.

Caution: Operating the detector when DC supply voltage is outside the specified voltage range may cause damage to internal components. For further information refer to the Product Specifications on page 11.

Attention : Faire fonctionner le détecteur lorsque la tension de l'alimentation CC se trouve en dehors de la plage de tension spécifiée peut endommager les composants internes. Pour plus d'informations, consultez les spécifications du produit à la page 11.

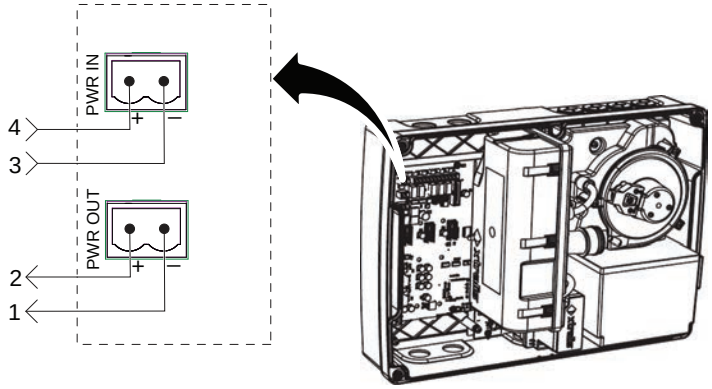


Figure 3-7: Wire connection details for power terminals

Power to Multiple Detectors

Up to eight detectors may be daisy chained to the same power supply by connecting the PWR OUT power passthrough socket to the PWR IN socket on each subsequent detector.

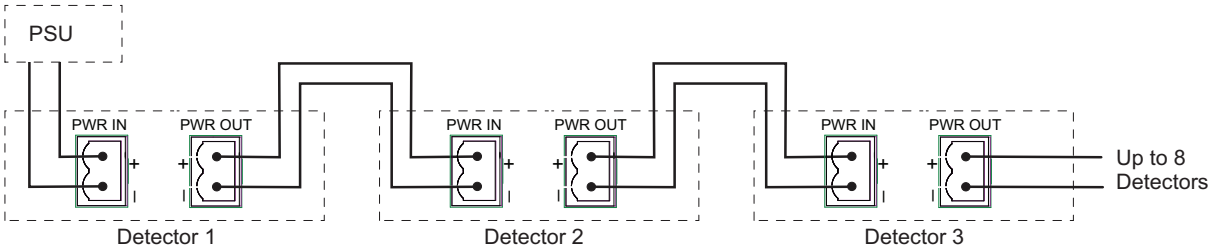


Figure 3-8: Multiple Detectors powered by a single power supply

Compliance

It is recommended that the power supply be compliant with local codes and standards required by the regional authority. For code-specific information, refer to Codes and Standards Information for Air Sampling Smoke Detection on page iii.

3.2.3 Communication Ports

The front cover must be removed from the VLI in order to access the communication ports. Refer to Section 7.2 for the front cover removal procedure.

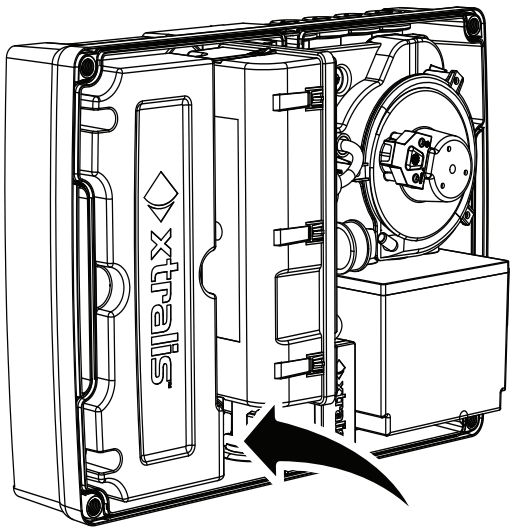


Figure 3-9: Location of the USB and Ethernet communication ports

USB

The USB port is used for initial configuration and local maintenance or servicing of the VLI using Xtralis VSC software. Use the Ethernet port for a permanent network connection to the detector to allow remote configuration or monitoring.

Install Xtralis VSC prior to connecting the VLI to the PC or Laptop. This ensures that the required USB drivers are present.

Note: Refer to the Xtralis VSC documentation for operating system compatibility information.

Ethernet

The Ethernet port is used for permanent network connection to the VLI. An Ethernet lead can be inserted into the port and routed out beneath the ESD cover and through the cable entry ports.

Use a standard Ethernet lead when connecting the VLI to a network switch, router or directly to a PC or laptop.

Note: For EMC compliance, the Ethernet lead requires a ferrite to be fitted. Refer to Figure 3-10.

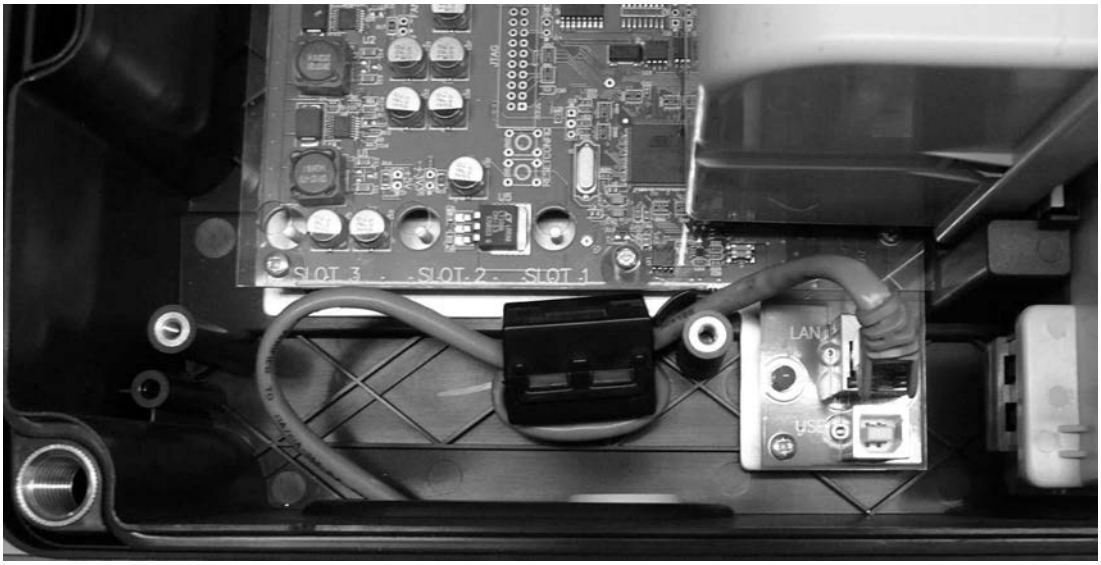


Figure 3-10: Ethernet lead with Ferrite

3.2.4 VESDAnet

VESDAnet is a bidirectional data communication network between connected VESDA devices. VESDAnet connectivity is available on the VESDAnet enabled VLI detector (VLI-885). Refer to Section 2.7 for further information.

It is recommended that RS 485 (Belden 9841 - 120 Ohm) twisted pair cables be used for including the devices in the network.

The network cables are terminated at the VESDAnet A and B Terminals on the VESDAnet card. Cabling from one VESDA device is brought into the detector at one terminal and looped out to another device on VESDAnet from the other terminal.

Notes:

- Connection between devices should be from A to B. Avoid using A to A or B to B.
- The polarity of the data wires must be maintained throughout the network.

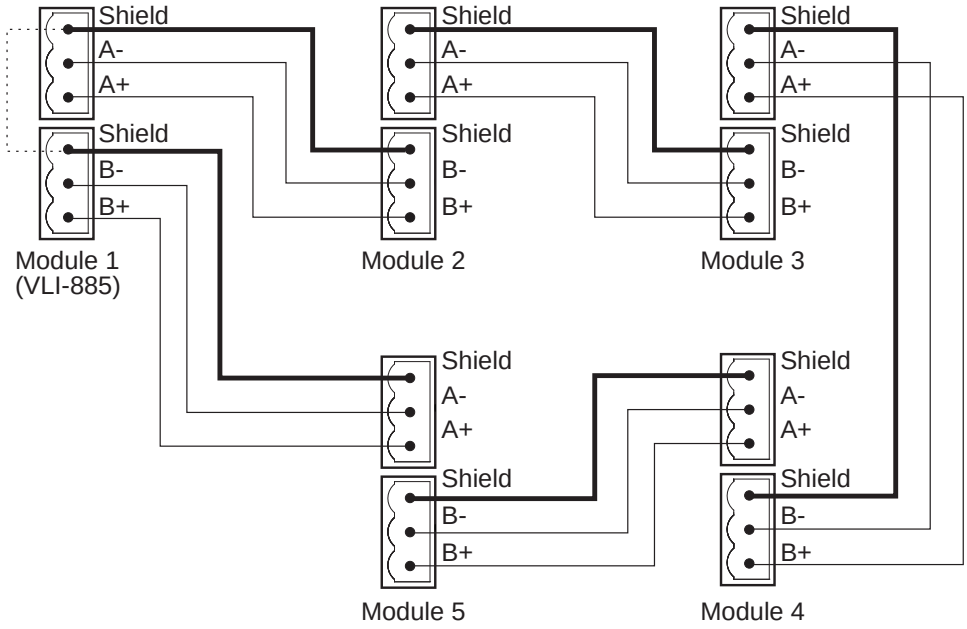


Figure 3-11: Example closed loop VESDAnet network

The VLI-885 detector is shipped with the VESDAnet A and B terminals looped. Remove the A and B links prior to connecting the detector to the VESDAnet. If the detector is not to be networked with other devices, then do not remove the A and B links.

Note: For each VLI-885 detector connected on VESDAnet, ensure that the shield link wire (supplied) is retained as shown by the dotted line in Figure 3-11. The link wires [A+ to B+] and [A- to B-] (not shown in the figure but supplied for stand-alone operation) should be removed. On other VESDAnet devices all the link wires are removed when connected on VESDAnet.

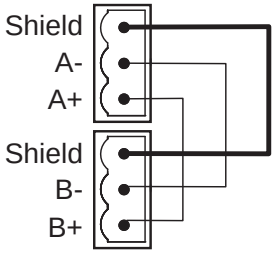


Figure 3-12: Closed loop for standalone detectors with VESDAnet capability

Note: Refer to the VESDA Communications Guide for further information.

3.2.5 Relays

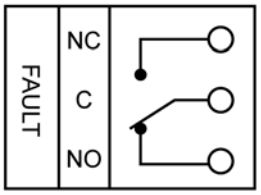
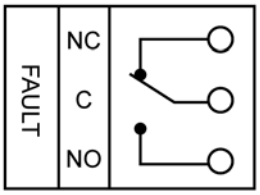
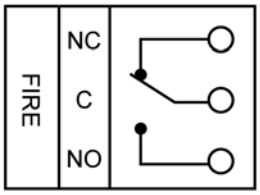
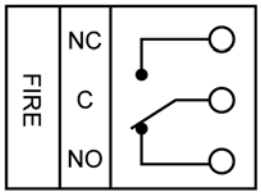
The relays, located on the main processor card, interface to the Fire Alarm Control Panel (FACP) to communicate faults, alarms and disabled states.

Fault and Fire1 Relay Terminals

Fault (Trouble) and Fire1 (Alarm) relay terminals are located on the main board inside the detector.

The Fault relay is energized during normal operation while the Fire1 relay is only energized when a Fire1 is detected. The operation of the relays are summarized in the following table.

Table 3-1: Fault and Fire Relay Operation

FAULT Relay		FIRE1 Relay	
Normal Operation (Energized)	**Fault or unpowered state**	**Normal Operation (De-energized)**	**Fire**
			

Programmable Relays

The three additional relays can be programmed using Xtralis VSC software or the LCD Programmer if the detector is on a VESDAnet. Refer to the Xtralis VSC Online Help or LCD Programmer Product Guide for details.

3.2.6 Unmonitored General Purpose Input (GPI)

The GPI is a programmable input which can be configured to initiate a number of different actions, including, by default, a Remote Reset function. Refer to Section 5.5.4 on page 43 for further information.

Notes:

- When the detector is disabled or set to standby via the GPI, the status cannot be changed through the normal enable / disable functions on the Display Module or the LCD Programmer.
- When the night-time thresholds are invoked via the GPI, the clock settings for day-start and night-start are overridden.

The GPI requires a voltage supply between 5V and 30 VDC from the connected device in order to operate. The input is isolated from the system by an opto-coupler device.

3.2.7 Monitored General Purpose Input (GPI) Wiring

Monitored GPI is available on the VLI-885 detector. It includes the same functions as the unmonitored GPI, with power supply monitoring as the default setting.

With monitored GPI, the detector monitors the GPI for open or short circuit faults when the GPI function is set to any value.

When the GPI function parameter is set to Mains OK, the detector indicates an external equipment fault condition by monitoring the line impedance. A 2K7 End of Line (EOL) resistor is supplied with the product and must be assembled in parallel with the device to be monitored.

The EOL resistor provides a known termination to the external equipment, this allows the VLI detector to identify open or short circuits.

Note: When monitored GPI is set to Inverted Reset, GPI ON/OFF senses changes. A short circuit sets GPI OFF and EOL sets GPI ON.

3.2.8 Typical Wiring to Fire Alarm Control Panel (FACP)

The diagram below shows the correct way to wire VESDA detectors to a conventional fire alarm control panel (FACP). It also shows where an End Of Line (EOL) resistor is correctly installed.

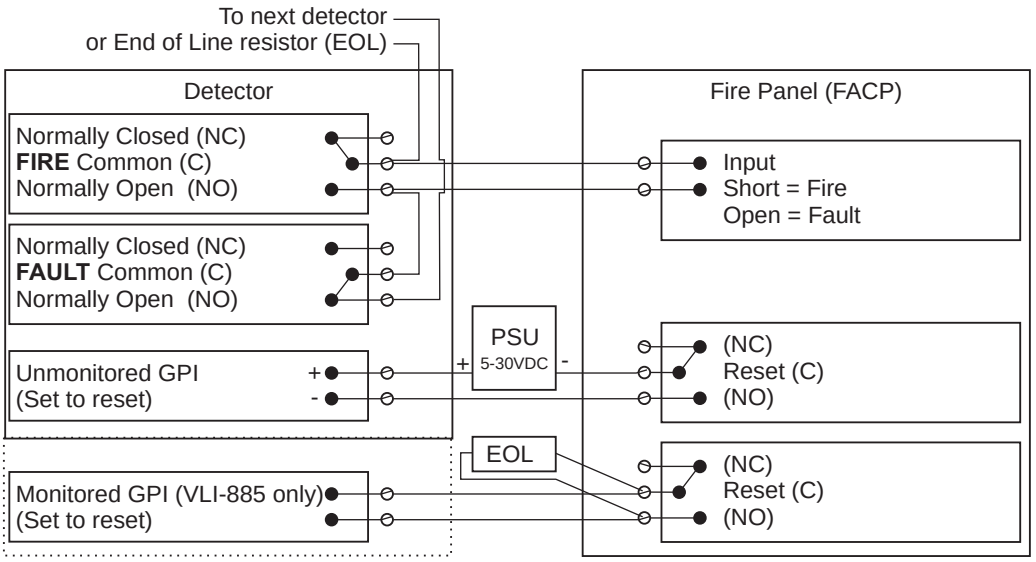


Figure 3-13: Typical wiring to a fire panel with EOL

3.2.9 Typical Wiring to Address Loop Module

This wiring example is for wiring VESDA detectors to a typical Input/Output Loop module 3 inputs 1 output. It shows how to use Unmonitored or Monitored GPI (VLI-885 only) to reset the detector.

This wiring example is for wiring VESDA detectors to a typical Input/Output Loop module 3 inputs 1 output.

Note: These are example drawings. Refer to the appropriate product manual for the exact wiring details of the third party equipment.

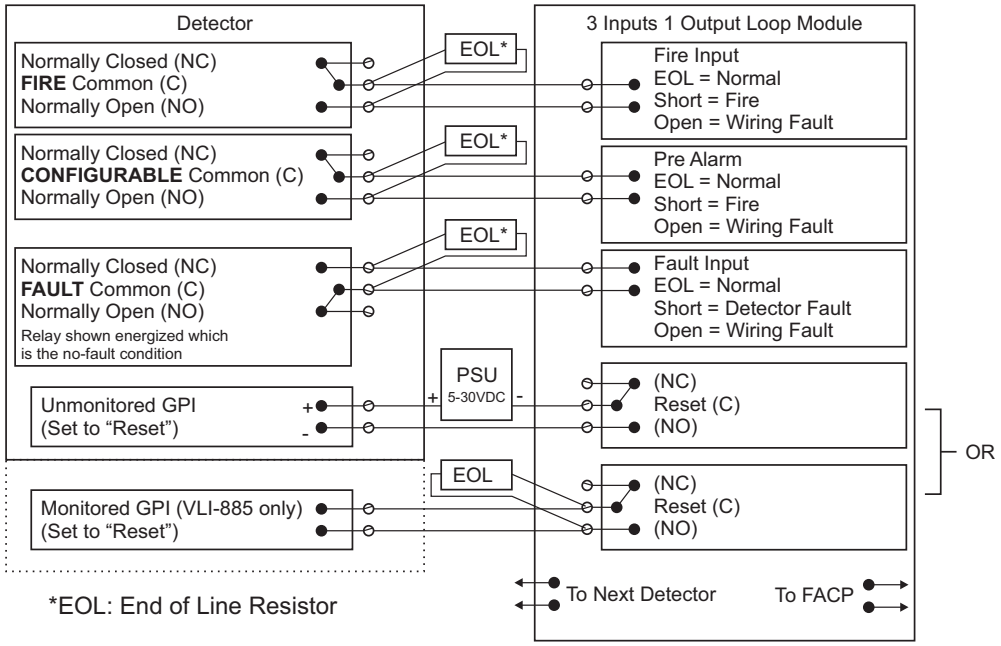
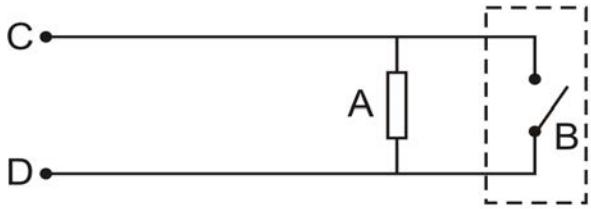


Figure 3-14: Input/Output Loop Module with EOL

3.2.10 Typical Wiring for Monitored GPI for PSU Monitoring (VLI-885 only)

The diagram below shows the correct way to configure power supply monitoring with a VLI-885 detector. It also shows where an End Of Line (EOL) resistor is correctly installed.



Legend	
A	End of Line Resistor (2.7k)
B	External device (1 to N)
C	GPI Pin 1
D	GPI Pin 2

Figure 3-15: Power Supply Connection Diagram

3.2.11 Specify Backup Battery

In the event of a mains power supply disruption, the VLI detector runs on a backup battery located in the external power supply (the power supply must be compliant with local fire protection codes and standards). The size of the battery is determined by:

- local codes and standards
- the total power required by the system
- back up time required
- allowance for reduction in capacity with age
- expected temperature variations

Note: It is recommended that batteries be inspected and changed as per manufacturer's specifications or as per local codes and standards.

To facilitate the calculation of the backup battery size, a Battery Calculation Sheet is included below.

Table 3-2: Calculating the size of backup battery

Equipment	**Normal loads @ 24 V DC**			**Full alarm load @ 24 V DC**		
	Load mA	**Qty**	**Total**	**Load mA**	**Qty**	**Total**
Detector	415			440		
Remote Display	60			110		
Remote Programmer	50 (backlight off)			80 (backlight on)		
Hand-held Programmer	50 (backlight off)			70 (backlight on)		
System Relay Module	60			105		
Other 24V Loads		Total mA			Total mA	
			X			X
	Standby Hours			Alarm Hours		
			=			
	Standby Capacity			Alarm Capacity		
				Total Capacity = Standby + Alarm		
				Divided by 1000 for Standby Capacity		
				Multiply by battery factor X1.25		

Note: If the GPI is set to Mains OK, the aspirator speed will be maintained for one hour after the loss of mains power, after which the aspirator speed will be limited to the minimum speed (speed setting 1) to conserve power.

3.3 Powering Up

After installing the detector it is necessary to power up the system. The power up sequence lasts approximately 15 seconds.

The VLI detector does not have a power switch i.e it is an "always on" device which is activated by applying powered cabling to the power input terminal on the main board (Figure 3-7). This process must only be performed by Xtralis accredited personnel.

If the system fails to power up, check all power wires are secured to their terminals and that the polarity is correct.

On power up:

- The Power LED illuminates and the detector runs a series of self-diagnostic tests.
- If there is a fault, the Fault LED illuminates. To identify the fault, check the Active Event List for the detector using the Xtralis VSC software.
- The aspirator starts up and air may be felt flowing out of the exhaust port.

It is normal for the detector to display troubles immediately after the first power up. Reset the detector by pressing the reset button on the front of the unit. This will unlatch the relays and turn off the Fault LED. Any remaining faults will cause the Fault LED to illuminate again. Proceed with the preliminary system check.

3.4 Installation Checklist

Site Name	
Address	
Detector Serial Number(s) and Date of Manufacture	
Name of Installer	
Signature	
Date	

Perform the following checks listed below to ensure that all the necessary items are completed before handing over to a commissioning engineer.

Installation Checks	**Yes**	**No**
Were the detector and the mounting bracket intact in the box?		
Is the detector securely locked onto its mounting bracket?		
Are the sampling air pipes firmly connected to the air inlet ports? Ensure that the pipes are NOT glued.		
Have the power wires been connected to the correct terminals on the detector?		
If required, has the end of line resistor been connected?		
Have the alarm and fault signaling wires been terminated to the correct terminals of the detector?		
Has the plug at the exhaust port been removed? Ensure that the exhaust pipe (if fitted) is NOT glued.		
Has the front cover been fitted correctly?		
Is the air sampling pipework installed and checked as per the site plans?		
Are the VESDAnet terminals looped back on a standalone VESDAnet enabled detector? Refer to Section 3.2.4 for further information.		
Is the Intelligent Filter installed and its lever locked down?		

3.5 Preliminary System Check

A preliminary system check is required after installing the VLI detector, before it is commissioned for use. The check can be conducted by connecting to the detector using the Xtralis VSC software. The preliminary systems check includes:

- Configuring the "pipes in use" setting. This option can be found in the Airflow settings tab of the VLI configuration dialog in Xtralis VSC.
- Normalizing the air flow. This command can be found in the Device menu in Xtralis VSC. All detectors out of the factory must be normalized.
- Conducting a basic pass/fail smoke test.

For details on the preliminary systems check, refer to the Commissioning Guide section of the VESDA System Design Manual.

4 Pipe Network Design

The Pipe Network should be designed by trained personnel, and verified using the ASPIRE software.

4.1 Design Considerations

The following points should be considered when designing a pipe network for the VLI detector:

- At all times the detector requires a minimum total airflow of 40 liters per minute, and a minimum of 20 liters per minute per pipe. It is possible that over a period of time sampling holes may block due to environmental conditions which may result in reduced airflow, hence it is highly recommended that detector and pipe flows be set to 20% higher than required minimums i.e. set detector flow to minimum 50 liters per minute and a minimum of 25 liters per minute pipe flow.
- It is preferred to use at least two pipes in the design (use pipe inlets 2 and 3) with a flow rate of at least 25 ltr/min per pipe, and detector flow rate at least 50 ltr/min. Verify the design using the ASPIRE software. If required, use higher aspirator speed setting to meet these limits.
- Similarly, for single pipe installations, the pipe flow rate should be at least 50 liters per minute. Verify the design using the ASPIRE software. If required, use higher aspirator speed setting to meet this limit.
- Avoid using exhaust pipes unless there is substantial pressure differential where exhaust pipe needs to be go back to the sampling area, keep exhaust pipe length minimum. Refer to Section 4.4. for further information.
- VESDA VLI is specifically designed to cater for industrial applications where high background levels exist. It is recommended that minimum hole sizes of 3mm shall be used for these applications. Certain industrial applications will require the facility to conveniently blow out (Back Flush) the pipe network during maintenance regimes. Refer to Xtralis document 20016, Pipe Network Back Flush.

Refer to the VESDA Pipe Network Design Guide for best design practices.

4.2 Installation Considerations

The following points should be considered when installing sampling pipe:

- Minimize flexing in sampling pipes by supporting the pipe every 1.5m (5ft) or less, or at a distance described in local codes and standards.
- Evenly arrange the sampling pipe network over return air grilles.
- Sampling pipe fits firmly into the tapered detector port, DO NOT glue this connection.
- Allow sufficient movement at the detector to permit pipe removal for maintenance.
- Keep the exhaust pipe as short as possible to minimize airflow resistance in the pipe.
- Pipe ends must be made smooth for bonding.
- Sampling holes must be drilled in line and perpendicular to the pipe.
- Sample holes must be clear of rough edges and debris.
- Pipes are free of debris.
- All joints must be bonded except the endcaps and pipes entering the detector.

Notes:

- Sampling holes should face into the direction of airflow, or point downwards in static airflow situations.
- Keep the sampling holes evenly spaced.
- Counter-sunk holes are recommended for harsh environments.
- For code-specific information, see Codes and Standards Information for Air Sampling Smoke Detection on page iii.

Refer to the Pipe Network Installation Guide for best installation practices.

4.3 Inlet Pipes

The VLI detector supports up to four sampling pipes.

The air inlet ports in the pipe inlet manifold are tapered such that they accommodate both 25 mm (1 in) or IPS ¾ inch outer diameter pipes.

Each air inlet port allows maximum insertion of the sampling pipe to a depth of 15 mm. (0.60 in). This prevents the sampling pipes from damaging the flow sensors. While connecting the detector to the pipe network:

- Ensure a minimum length of 500mm (20in) of straight pipe before terminating the pipes at the air inlet ports of the detector.
- Square off and de-burr the end of the sampling air pipes, ensuring the pipes are free from debris.
- Determine the Air Inlet Ports to be used. Refer to Table 4-1 below for details.
- Remove the plugs from only those Air Inlet Ports intended for use.
- Insert the pipes into the pipe inlet(s) ensuring a firm fit.

Note: DO NOT glue the inlet pipes to the pipe inlet manifold.

When configuring the detector ensure that the correct pipes in use are selected:

Table 4-1: Preferred use of pipe inlet ports

No. of Pipes	Preferred Pipe Inlet Port to use			
	Pipe 1	**Pipe 2**	**Pipe 3**	**Pipe 4**
1		Inlet 2 or 3	Inlet 2 or 3	
2		✔	✔	
3	Inlet 1 or 4	✔	✔	Inlet 1 or 4
4	✔	✔	✔	✔

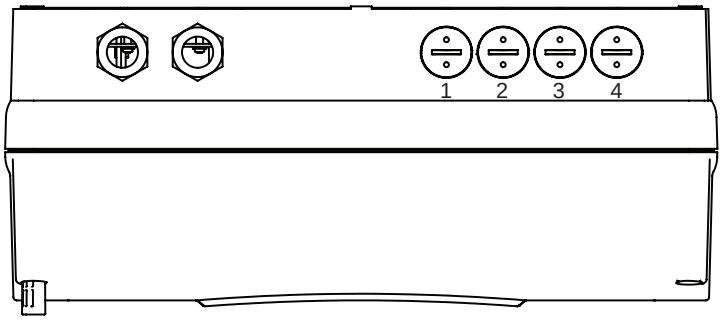


Figure 4-1: Pipe inlet port numbering

For code-specific information, refer to Codes and Standards Information for Air Sampling Smoke Detection on page iii.

4.4 Managing the Exhaust Air

Air is expelled from the detector via the exhaust port at the bottom of the unit enclosure.

The air exhaust port is tapered to accomodate standard pipes of OD 25 mm (ID 21 mm) or IPS ¾ inch and to provide an airtight seal. Remove the exhaust port plug and if required, connect an outlet pipe to the exhaust manifold. DO NOT glue this pipe to the exhaust manifold as this will void the warranty.

Where the detector is located outside the protected environment, it may be necessary to return the exhaust air to the same environment. For example, where pressure differences exceed 50 Pa, or where hazardous substances are present inside the protected environmenet. Return air pipes need to be as short as possible to minimize the effect of airflow impedance in the return air pipe network.

5 Configuration

The VLI detector is configured using Xtralis VSC software installed on a direct or network connected PC.

The following information is provided in this chapter:

- how to connect to a standalone detector
- how to connect to a detector on an Ethernet network
- how to connect to a detector on a VESDAnet
- access levels
- commands
- configuration options
- relay options
- GPI functions
- default settings

5.1 Connecting to a Standalone VESDA VLI Detector

Once physical connectivity has been established (refer to Section 3.2.3), the Xtralis VSC software can connect to the VLI detector using one of a range of communication protocols. Connection methods must be defined and saved for future use within the Connection Manager in Xtralis VSC.

To define a connection to a standalone VLI detector connected via USB or Ethernet, follow this procedure:

1. Select **Connection | Manager** from the menu system.
   The Connection Manager dialog is displayed.

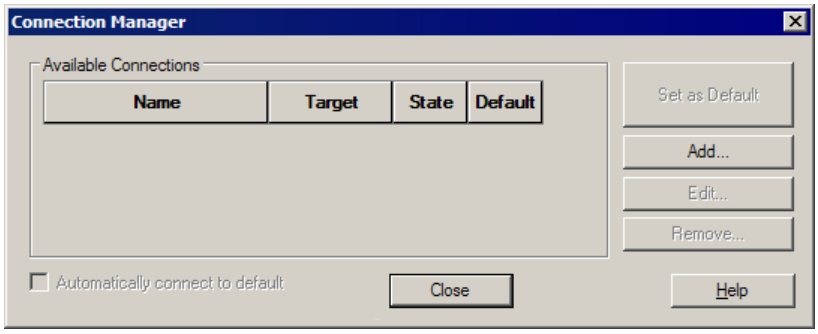


Figure 5-1: Connection Manager

2. Select **Add**.
   The Add Connection dialog is displayed.

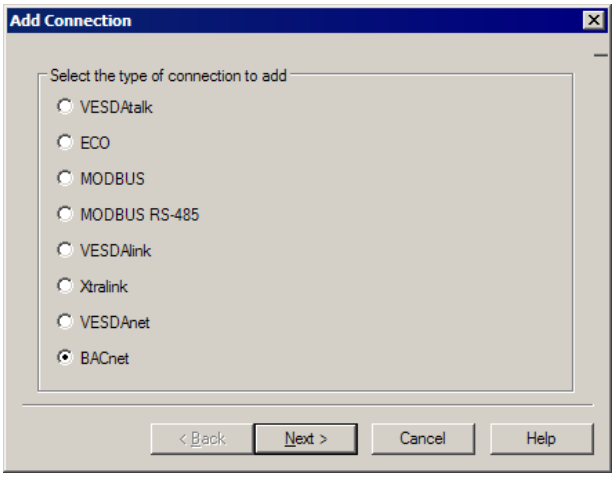


Figure 5-2: Add Connection

3. Select the BACnet connection option, then select **Next**.

5.1.1 Creating a USB Connection

1. Open the VLI detector and connect the USB cable from the USB socket on the main board inside to a PC or laptop located near the detector with the Xtralis VSC software installed. Refer to Chapter 1 for further information on opening the detector.
2. Follow the steps in Section 5.1.
3. Select BACnet from the Add Connection dialog box (Figure 5-2).
4. Select USB, then select Next (Figure 5-3).

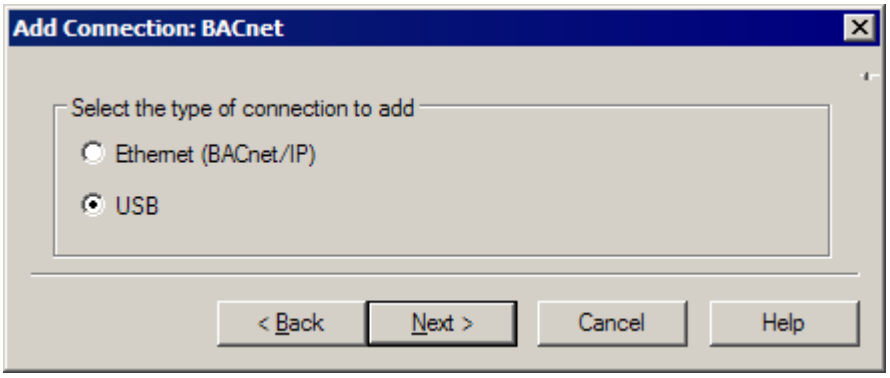


Figure 5-3: Select USB

5. Select the detector type from the list of available detectors, then select Next (Figure 5-4).

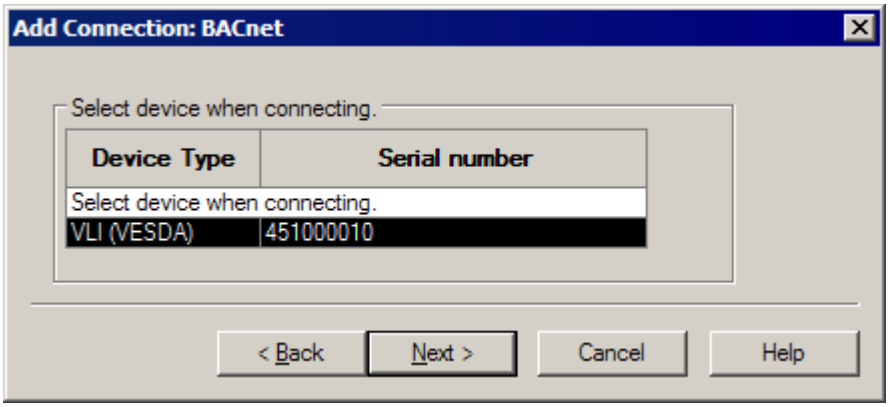


Figure 5-4: Select Device

6. Accept the pre-generated BACnet Device ID number, then select Next (Figure 5-5).

Figure 5-5: Enter a BACnet ID

7. Enter a unique name for the Connection or accept the pre-generated name, then select Finish (Figure 5-6).

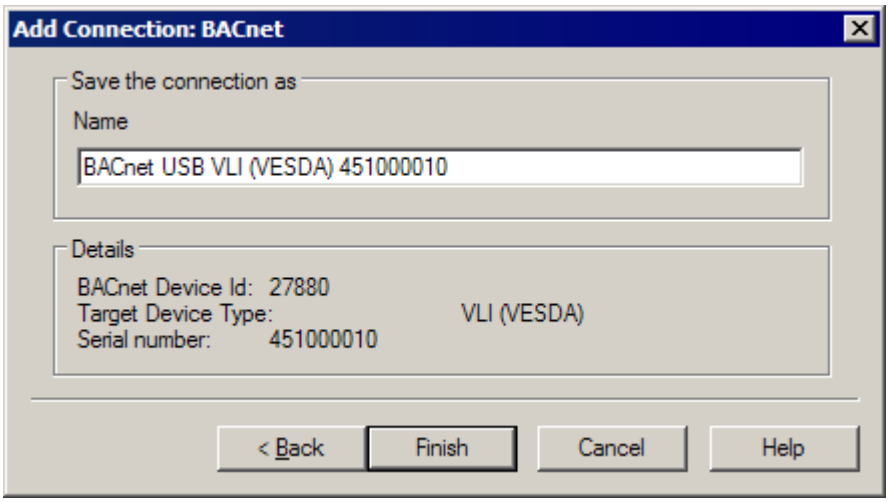


Figure 5-6: Enter a Connection Name

5.1.2 Creating an Ethernet (BACnet/IP) Connection

Notes:

- If a number of detectors are networked via Ethernet, it is recommended that they be connected to a dedicated Ethernet switch and then the switch is connected further up in the network with adequate security measures to limit access only to authorized personnel.
- The VLI is not secured. It is responsibility of the enterprise using VLI detectors to protect them on an Ethernet network for use by authorised personnel only.

1. Follow the steps in Section 5.1.
2. Select BACnet from the Add Connection dialog box (Figure 5-2).
3. Select Ethernet (BACnet/IP), then select Next (Figure 5-7).

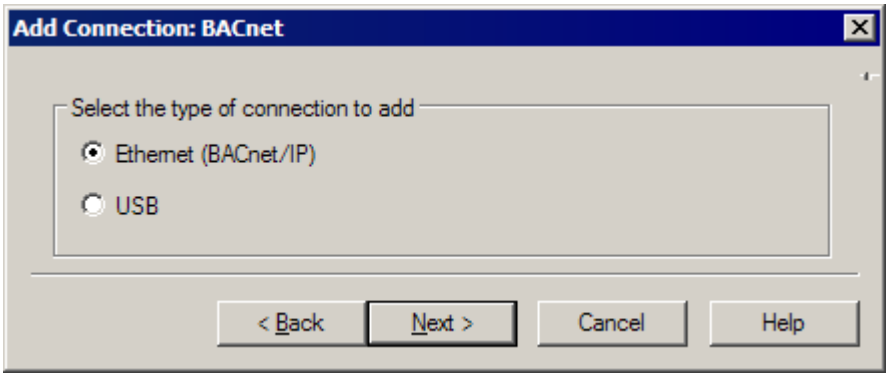


Figure 5-7: Select Ethernet (BACnet/IP)

4. Enter a unique IP address, then select Next. If the detector is being connected to a corporate or dedicated network, this address may need to be provided by the network administrator (Figure 5-8).

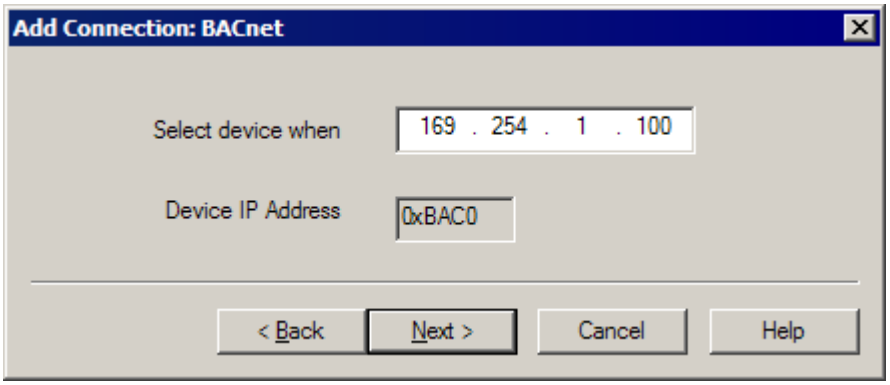


Figure 5-8: Enter IP Address

Note: The factory default IP Address for the VLI is 169.254.1.100. This allows direct connection between a PC or Laptop and the VLI using a standard Ethernet lead. To change the IP address it is necessary to connect to the VLI using a USB connection and use Xtralis VSC to edit the network settings for the detector.

1. Enter a unique BACnet Device ID, then select Next (Figure 5-9).

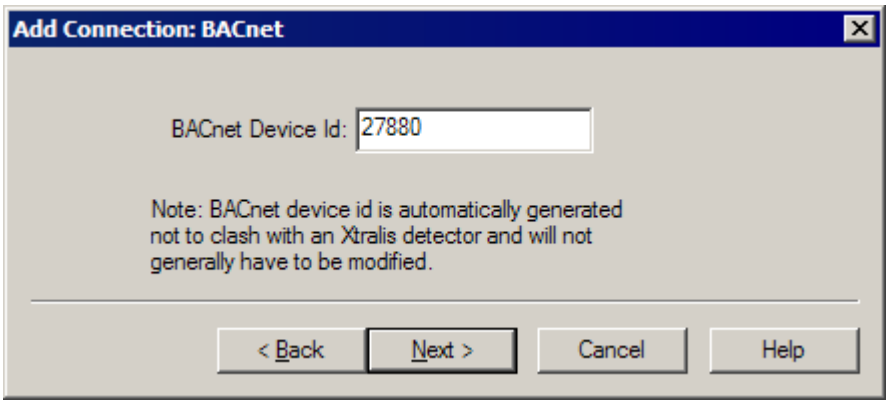


Figure 5-9: Enter BACnet Device ID

2. Enter a unique name for the Connection, then select Finish.

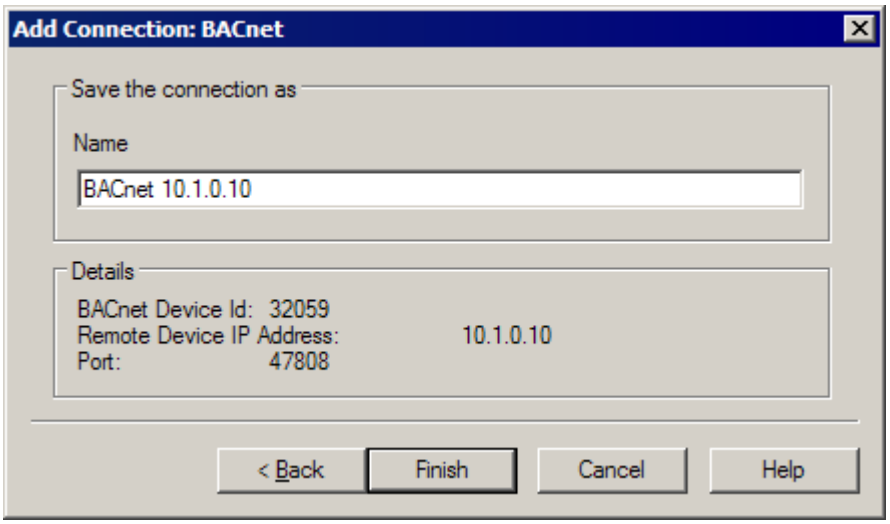


Figure 5-10: Enter Connection Name

Note: For specific information relating to network configuration, refer to the VESDA Communications Guide.

5.2 Connecting to a VESDA VLI on VESDAnet

The following is required in order to access a VLI-885 via VESDAnet:

- the VESDAnet is physically connected, as described in Section 1.0.1.
- a High Level Interface (HLI) must be connected between the PC or Laptop with Xtralis VSC and an RS485 port in one of the devices on the VESDAnet.
- a connection to the VESDAnet has been defined in the Xtralis VSC connection manager. See below for the procedure to do this.

Note: Refer to the VESDA Communications Guide for detailed information on VESDAnet.

Define to a new VESDAnet Connection

1. Follow the steps in Section 5.1.
2. Select VESDAnet from the Add Connection dialog box (Figure 5-2).
3. Select the COM port associated with the High Level Interface (HLI) connected to your PC or Laptop and click on the Next button.
4. Enter the name you want to identify the connection with in the Name field and click on the Finish button.

Access the VESDA VLI

1. Connect to the VESDAnet in Xtralis VSC using Connection Manager. The software automatically polls the VESDAnet for devices and lists them in the VESDAnet device list, or marks them active if they were manually added..

5.3 Access Levels

When first accessing the VLI detector via Xtralis VSC or LCD Programmer, user functionality is limited. For additional privileges, the user must log in to the detector using a four digit PIN code. In Xtralis VSC, select Logon from the Connection menu and enter the PIN.

Table 5-1: User Access Levels

User Level	Access Level	Functional Authorization
USR	Low	This is the USER or the OPERATOR level. The user can view the event log and change the date and time. They can also perform selected zone control functions.
ADM	High	At the ADMINISTRATOR level access is available to most functions. These include setting alarm thresholds, normalizing air flows, reset filter, and defining the relay configuration.
DST	Absolute	The DISTRIBUTOR level allows unlimited access to all the system commands and parameters.

The default PIN for each level of user is set at the factory. The distributor has access to the PINs for each level. PIN numbers are disclosed to authorized personnel attending accredited training courses.

After logging in the user has the option to change the default PIN. To guard against unauthorized access, if someone enters an incorrect PIN number three times they will not be allowed another attempt for ten minutes.

5.4 Commands

The following commands are able to be issued to the detector from the Device menu in the Xtralis VSC software:

Table 5-2: Detector Commands

Command	Description	Execute From	
		Detector	Xtralis VSC
Disable	The Disable command disables all the output relays associated with the detector. The aspirator remains active.	✔	✔
Enable	The Enable command enables all of the output relays associated with the detector.	✔	✔
Go to Standby	The Go to Standby command deactivates the aspirator and stops all signaling.		✔
End Standby	The End Standby command is available when the detector is in Standby mode. Restarts the aspirator and resumes all signaling.		✔
Reset	The Reset command unlatches all latched alarms and faults, and returns relays to their normal state. Clears the active event list. Reset does not enable a disabled detector or reactivate a detector that is in Standby mode.	✔	✔
Start Air Flow Normalization	Starts the air flow normalization process for the selected detector. The normalization process determines the reference flow rate. The detector can be in normal or disabled mode, but not standby mode. The aspirator remains on throughout the normalization process and no fault is reported unless the process fails to successfully complete. The normalizing status may be observed on the "detailed status" tab in the Xtralis VSC software.		✔
Start AutoLearn Flow	In Xtralis VSC you will be prompted to set the period of time that the environment is monitored to allow the system to decide what flow thresholds are most appropriate. When the AutoLearn has finished, the levels are overwritten.		✔
Cancel AutoLearn Flow	Cancel the AutoLearn Flow process. Flow thresholds will remain at levels set prior to commencing AutoLearn Flow.		✔

Table 5-2: Detector Commands (continued...)

Command	Description	Execute From	
		Detector	Xtralis VSC
Start AutoLearn Smoke	In Xtralis VSC you will be prompted to set the period of time that the environment is monitored to allow the system to decide what smoke thresholds are most appropriate. When the AutoLearn has finished, the levels are overwritten.		✔
Cancel AutoLearn Smoke	Cancel the AutoLearn Smoke process. Smoke thresholds will remain at levels set prior to commencing AutoLearn Smoke.		✔
Return to Factory Defaults	Restores the configuration of the detector to the initial factory default values.		✔
Set System Date and Time	Set the detector date and time.		✔
Start Major Fault Test	Generate a major fault on the detector and de-energizes the fault relay for 2 minutes.		✔
Start Minor Fault Test	Generate a minor fault on the detector and de-energizes the fault relay for 2 minutes.		✔
Start Alarm Test	Simulate full scale smoke level and initiates all alarm activity. Alarm relays will energize unless the detector is disabled.		✔
Start Airflow Fault Test	Test the air flow sensing system by shutting down the aspirator.		✔
Start Relay Test	Test the available relays by activating and deactivating as required.		✔
Start Lamp Test	Cycle through each lamp on the detector display panel.		✔
Clean Air Zero Chamber	Validate clean air reading to ensure absolute detection and safeguard against nuisance alarms. **Note:** This command will shut down the aspirator for up to a minute.		✔
Reset Intelligent Filter Life	Reset the Intelligent Filter status information. Execute this command after installing a replacement Intelligent Filter.		✔
Reset Secondary Filter Life	Reset the Secondary Foam Filter status information. Execute this command after installing a replacement Secondary Foam Filter.		✔
Reset Aspirator Life	Reset the smoke hours for the aspirator. Execute this command after installing a replacement aspirator.		✔

5.5 Configuration Options

The VESDA VLI device dialogue provides a range of configuration options. These settings are stored in the onboard memory of the detector, therefore any change made using Xtralis VSC which can be viewed on a VESDAnet will be visible on a programmer, and vice versa.

The following sections provide detector configuration based on using the Xtralis VSC software. Information on using the LCD Programmer is contained in the LCD Programmer Product Guide.

5.5.1 General Options

General options include some basic identification and Ethernet connectivity information for the detector.

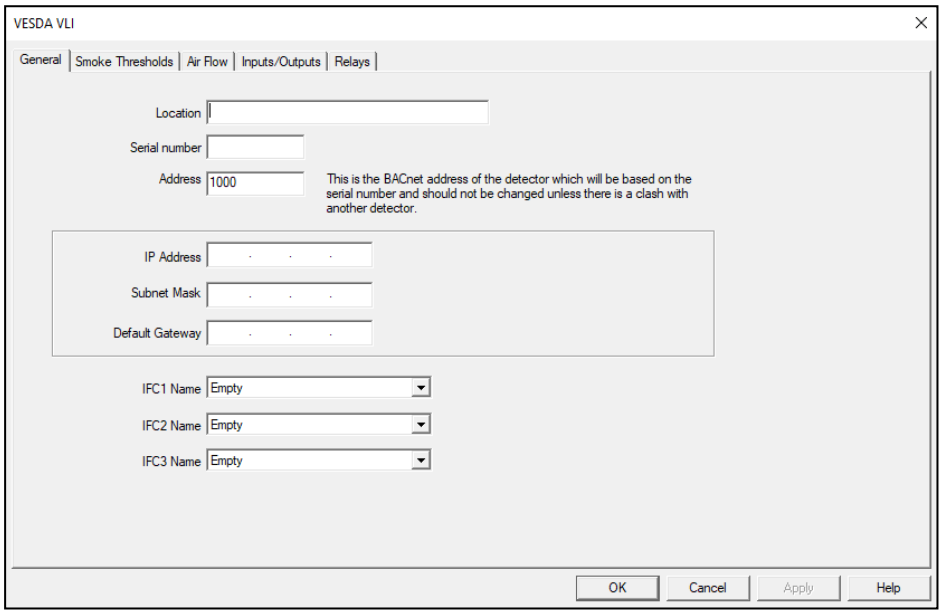


Figure 5-11: General Options

The General configuration options are as follows:

Location

A description of the physical location of the device.

Serial Number

The serial number of the device. This is factory set and cannot be changed.

Address

This field is contains a unique BACnet address. It is based on the serial number and should not be changed.

IP Address

The IP address of the detector, for use with Ethernet connections. This address must be used when creating a connection profile for the detector in Xtralis VSC.

The default IP address is 169.254.1.100. This allows direct connection between a PC or Laptop and the VESDA VLI using a standard Ethernet lead.

Prior to connecting the detector to a router or other gateway device, the default address must be changed to an address in the range used by the router. This can be done by connecting to the detector via USB or via Ethernet with a standard Ethernet lead.

Subnet Mask

The subnet mask for the device and broker addresses.

Default Gateway

The IP address of the router or other gateway device that is servicing the network.

5.5.2 Smoke Threshold Options

Smoke Threshold options provide the mechanism to set the smoke obscuration trigger point for each alarm level, and the ability to assign day or night thresholds to cater for different levels of activity in the protected area during these times.

Refer to Section 5.6 for the default settings.

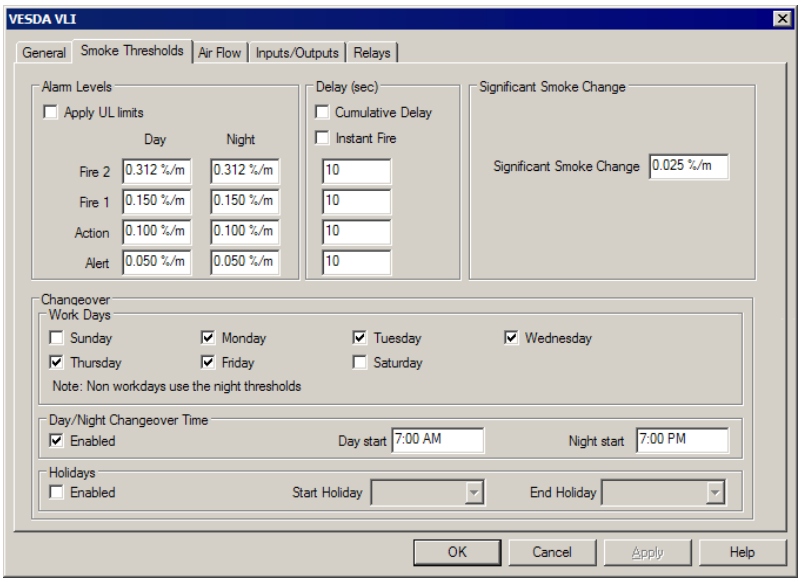


Figure 5-12: Smoke Threshold Options

The Smoke Threshold configuration options are as follows:

Apply UL Limits

If checked, the fire threshold will be limited to ensure that the detector is UL compliant. Ensure that when Apply UL limits is checked, Fire2 is set to the UL limit by exiting and then going back to the Smoke Thresholds options.

Day Thresholds

The settings for day time smoke thresholds. The threshold and the delay are used together to decide when to trigger the alarm condition.

Night Thresholds

The settings for night time smoke thresholds. The threshold and the delay are used together to decide when to trigger the alarm condition.

Delay

The length of time between the alarm threshold being reached and the relay operation.

- **Cumulative Delay:** If checked, the delay period for alarms is set to cumulative.
- **Instant Fire:** If checked, the time delays are ignored when the smoke level increases rapidly.

Significant Smoke Change

The smoke change level at which an event is recorded in the Event Log. The VLI is designed for harsh environments, so it is recommended that the Significant Smoke Change value is set to 0.05 %/m (0.015 %/ft) or half the value of the Alert level, whichever is greater.

Changeover

- **Work Days:** Select which days use both day and night thresholds. Night time thresholds are used if a day is not selected.
- **Day / Night Changeover Time:** The settings for the timing of the threshold changeover.
- **Holidays:** The settings used to define a holiday period. Use the dropdown calendars to choose the start and end times of the holiday (or break) period. Night time thresholds are used during the holiday period.

5.5.3 Airflow Options

Airflow options provide the ability to set:

- limits for what the detector considers to be normal airflow behavior for the sampling pipe network
- which pipe inlets are being used
- aspirator speed

These settings should be confirmed in the ASPIRE design of the sampling pipe network.

Refer to Section 5.6 for the default settings.

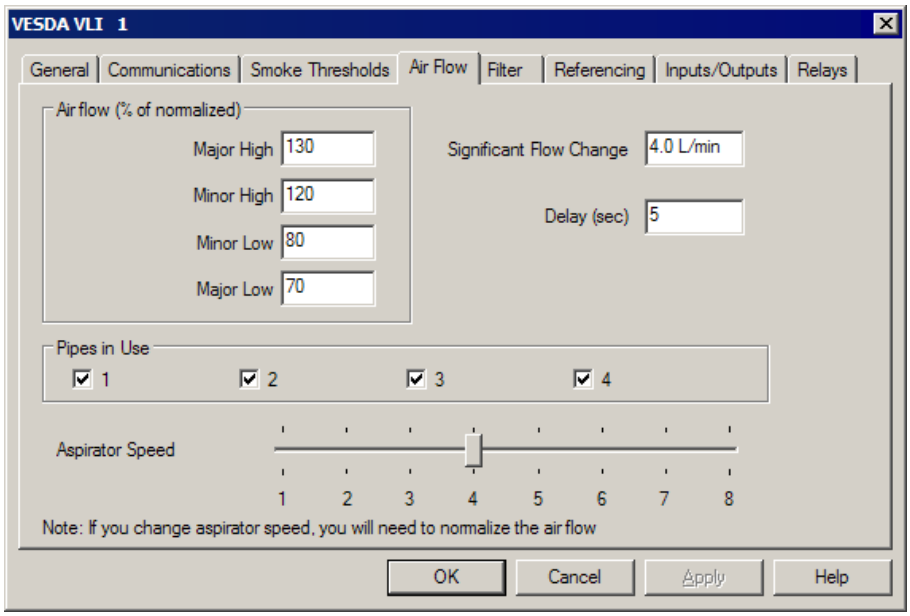


Figure 5-13: Airflow Options

The Airflow configuration options are as follows:

Air Flow

The air flow conditions, as a percentage of the normalized air flow, that will cause a fault to be reported. If the installation site flow conditions vary significantly, it is recommended that the Major High and Major Low parameters are set closer to their limits.

- **Major High:** The level of air flow considered to be so far above normal as to require urgent attention.
- **Minor High:** The level of air flow considered to be above normal but not urgent.
- **Minor Low:** The level of air flow considered to be below normal but not urgent.
- **Major Low:** The level of air flow considered to be so far below normal as to require urgent attention.

Significant Flow Change

The amount of airflow change at which an event is recorded in the event log.

Delay

The length of time between the air flow fault threshold being reached and the relay operation.

Pipes in Use

The pipes that are actually being used. Refer to Section 4.3 on page 31 for further information.

Aspirator Speed

The speed of the aspirator.

5.5.4 Input / Output Options

Input / Output options provide the ability to control the behavior of the General GPI and latching behavior of the fault and alarm relays.

The unmonitored GPI can be configured to initiate a number of different actions - including, by default, a Remote Reset function.

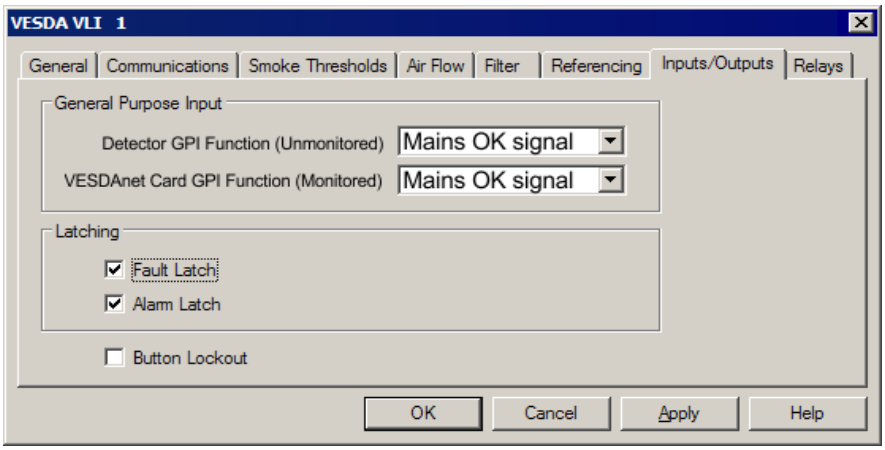


Figure 5-14: Input / Output Options

The Input / Output configuration options are as follows:

General Purpose Input (GPI)

The GPI is a remote input device for the detector that can be programmed to perform one of several functions. Refer to Table 5-3 below for a description of the individual selections.

- Detector GPI Function (Unmonitored): Supported by VLI-880 and VLI-885.
- VESDAnet Card GPI Function (Monitored): Supported by VLI-885.

Latching

- If **Fault** is checked, faults will be latched for signaling via relays, LEDs, VESDAnet and/or Ethernet.
- If **Alarm** is checked, alarms will be latched for signaling via relays, LEDs, VESDAnet and/or Ethernet.

Button Lockout

If checked, the Reset / Disable button on the front of the detector is disabled.

Table 5-3: GPI Operation

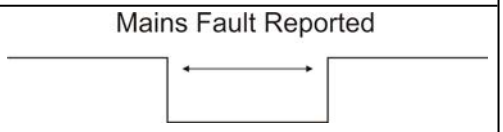
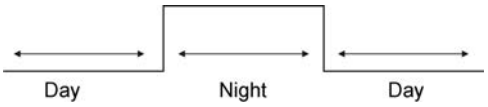
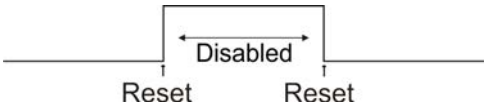
Function	State Change	
External Reset	**Unmonitored GPI** Detector Reset on a 0 VDC to 5 VDC rising edge. **Monitored GPI (VLI-885 only)** Detector reset on a contact closure.	
Mains OK	The detector monitors the state of the external power supply and responds to the following conditions. **Unmonitored GPI** • Mains OK ≥ 5 VDC at this terminal. • Mains Fail ≤ 2 VDC at this terminal. **Monitored GPI (VLI-885 only)** • Mains OK on contact open. • Mains Fail on contact closure.	

Table 5-3: GPI Operation (continued...)

Function	State Change	
Standby Mode	**Unmonitored GPI** The detector is disabled and the aspirator switched OFF when ≥ 5 VDC is at this terminal. **Monitored GPI (VLI-885 only)** The detector is disabled and the aspirator switched OFF on contact closure. **Note:** No Alarms can be generated in this state.	
Disable	**Unmonitored GPI** • The detector disables when the voltage rises above 5 VDC. • The detector is enabled when the voltage falls below 5 VDC. **Monitored GPI (VLI-885 only)** • The detector disables on contact closure. • The detector is enabled on contact open.	
Use Night-time Threshold	**Unmonitored GPI** The detector switches over from day-time to night-time thresholds when ≥ 5 VDC is at these terminals. **Monitored GPI (VLI-885 only)** The detector switches over from day-time to night-time thresholds on contact closure.	
Reset + Disable	While power is applied to the GPI the detector is disabled. In addition, the disconnection or connection of power to the GPI resets the unit. **Unmonitored GPI** • The detector disables when the voltage is ≥ 5 VDC. • The detector resets when the voltage is ≤ 2 VDC. **Monitored GPI (VLI-885 only)** • The detector disables on contact closure. • The detector resets on contact open.	
Inverted Reset (VLI-885 only)	Reset on the transition from contact closed to open.	

Notes:

- The signal voltage into the GPI terminals must be between 5 to 30 VDC.
- When the detector is disabled, enabled or set to standby as a GPI function, the status cannot be changed through the normal enable / disable / standby functions of the Display Module or the LCD Programmer.
- When the night-time threshold is configured as a GPI function, it overrides the clock settings for day-start and night-start.

When using the standby or remote disable options it is recommended that all displays on VESDAnet are configured to have the Isolate button locked out. When programming the display through the LCD Programmer choose Isolate Disabled from the Button Lockout menu.

5.5.5 Relay Options

Relay options provide the ability to determine which alarm or fault conditions the programmable relays respond to.

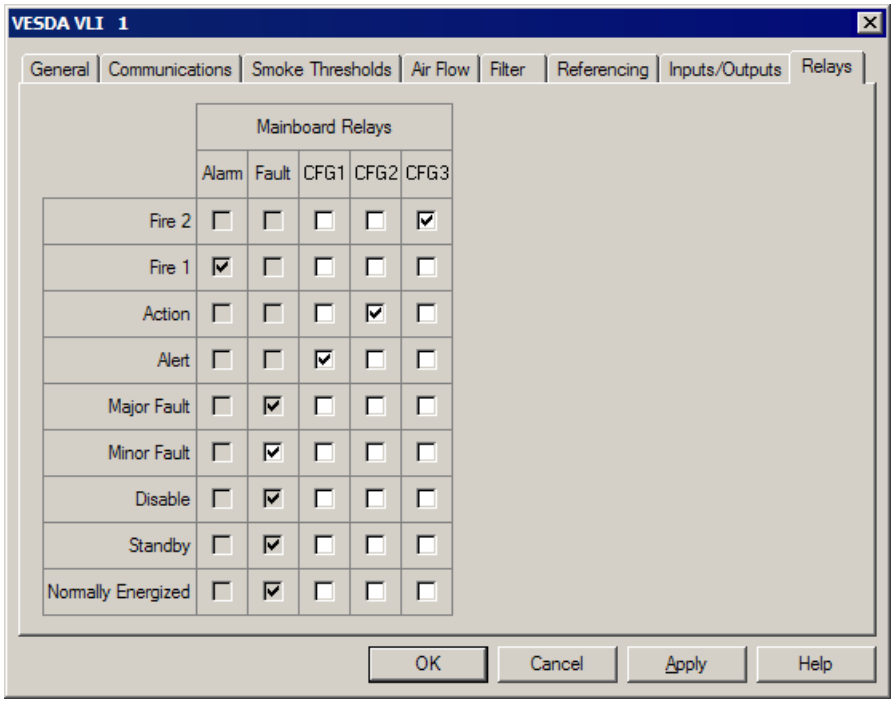


Figure 5-15: Relay Options

The Alarm relay is permanently assigned to Fire1, while the Fault Relay is permanently assigned to all fault and other non-alarm conditions, with the exception of Minor Fault.

Three additional relays, CFG1, CFG2 and CFG3, are fully configurable. For example, CFG1 could be configured to Alert, Fire2 or Minor Fault.

The normal state of the programmable relays can be set using checkbox in the **Normally Energized** row for a relay where:

- checked means the relay is energized.
- unchecked means the relay is de-energized.

Table 5-4: Default Relay Assignments

Relay	Default Assignment	Description	Normally Energized
Alarm	Fire1 (Alarm)	Energizes when an alarm is initiated.	No
Fault	Fault	De-energizes when a fault is detected.	Yes
CFG 1,2,3	n/a	Configurable	No

5.5.6 Communications Options

Communications options are available for the VESDAnet-enabled VLI-885 detector. They provide the ability to control network data transmission behavior.

Refer to Section 5.6 for the default settings.

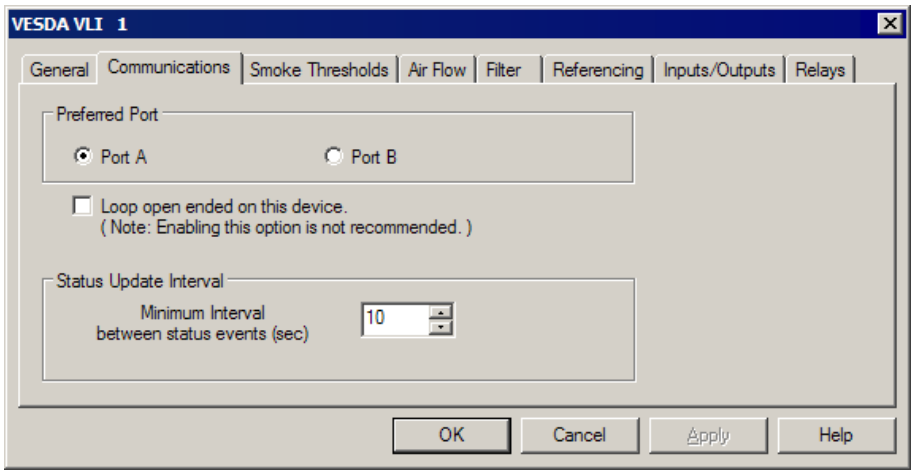


Figure 5-16: VESDAnet Communications Options

The Communications configuration options are as follows:

Preferred Port

The preferred VESDAnet port to be used to transmit network data from this device. The non-preferred port is used if for some reason transmissions on the preferred port fail.

For best performance in large networks, this setting should be randomly distributed between connected devices.

Loop Open Ended on This Device

If checked, the network has been wired so no connection will be terminated on this port.

If the detector is the last on an open-ended loop, i.e. the non-preferred port is not connected, this should be checked.

Status Update Interval

The interval between status events for the selected detector within its zone.

5.5.7 Referencing Options

Referencing is a technique used to reduce false alarms.

The VLI requires VESDAnet connectivity to separate detector located outside of the protected area, which is used to take readings of the background level of smoke and pollutants outside of the protected area. These readings are then referenced to the readings from the detectors in the protected area. This allows the detectors inside the protected area to determine if a rise in smoke levels is due to background pollution or a problem inside the protected area.

Refer to Section 5.6 for the default settings.

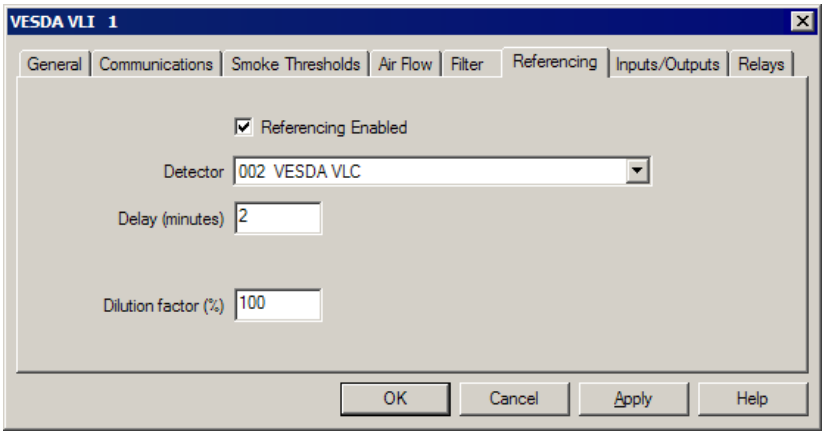


Figure 5-17: Referencing Options

The Referencing configuration options are as follows:

- **Referencing Enabled:** If checked, referencing is enabled.
- **Detector:** The name of the detector or system which provides the reference signal. Select from other detectors on the VESDAnet.
- **Delay:** The length of time between the external smoke rise and the internal subtraction of the smoke rise.
- **Dilution Factor:** The percentage of the reference signal to be subtracted from the internal detector signal.

5.6 Default Settings

Table 5-5: Default Settings

Parameter	Default Values	Range		Access Level
		Minimum	Maximum	
Event Log - Events				
• Smoke Level	Enabled	n/a	n/a	Adm
• Alarms	Enabled	n/a	n/a	Adm
• Faults	Enabled	n/a	n/a	Adm
• User Action	Enabled	n/a	n/a	Adm
Thresholds				
• Alert	0.2% obs/m (0.063% obs/ft)	0.05% obs/m (0.016% obs/ft)	1.990% obs/m (0.6218% obs/ft)	Adm
• Action (Pre-Alarm)	0.3% obs/m (0.094% obs/ft)	0.1% obs/m (0.031% obs/ft)	1.995% obs/m (0.6234% obs/ft)	Adm
• Fire1 (Alarm)	0.4% obs/m (0.125% obs/ft)	0.15% obs/m (0.047% obs/ft)	2.0% obs/m (0.63% obs/ft)	Adm
• Fire2	2.0% obs/m (0.63% obs/ft)	0.155% obs/m (0.05% obs/ft)	20.0% obs/m (6.3% obs/ft**)	Adm
Alarm Delays	10 Seconds	0 Seconds	60 Seconds	Adm
Delay Times	Simultaneous	Simultaneous	Cumulative	Adm
Instant Fire	Disabled	Enabled	Disabled	Adm
Change-over Times: • Day • Night	 • 07:00:00 • 19:00:00	Two Seconds	11:59:58	Adm
Weekend	Saturday & Sunday	Adjust to suit environment	Adjust to suit environment	Adm
Holidays • First Day • Last Day	 • 1-Jan-90 • 1-Jan-90	Adjust to suit environment	Adjust to suit environment	Adm
Smoke Change: • Change by: • Min. Interval	 • 0.02% obs/m (0.0063% obs/ft.) • 2 seconds	 • 0.02% obs/m (0.0063%obs/ft.) • 2 seconds	 • 0.2% obs/m (0.063% obs/ft.) • 10 seconds	Adm
AutoLearn	14 days 0 hours 0 minutes	0 days 0 hours 15 minutes	15 days 23 hours 59 minutes	Adm
Air flow Thresholds: • High Urgent • High Minor • Low Minor • Low Urgent • Delay	 • 150% • 130% • 70% • 50% • 30 seconds	 • 105% • 105% • 25% • 25% • 15 seconds	 • 200% • 200% • 95% • 95% • 600 seconds	Adm
UL Version	On	Selectable	Selectable	Adm
VESDAnet enabled detectors				

Table 5-5: Default Settings (continued...)

Parameter	Default Values	Range		Access Level
		Minimum	Maximum	
Reference detector: • Dilution • Delay	 • 100% • 2 minutes	 • 1% • 0 minutes	 • 100% • 15 minutes	Adm
Detector Comms: • Preferred Port • Open - ended	 • A • None	 • n/a • n/a	 • n/a • n/a	DST
VESDAnet Comms: • Health Check • Network Delay	 • 45 seconds • 15 seconds	 • 40 seconds • 10 seconds	 • 60 seconds • 45 seconds	DST

** In default "UL mode", maximum sensitivity is limited to 4%/ft

6 Commissioning

The VLI has been designed to simplify commissioning processes. The AutoLearn function allows the unit to assess its environment and setup appropriate alarm and flow thresholds.

The detector is programmed using Xtralis VSC software or LCD Programmer via VESDAnet.

Once the VLI detector has been commissioned, it will report alarms and faults according to the parameters defined during installation.

Note: Detectors should be commissioned with a smoke test.

Prior to commissioning the detector:

1. Check that the pipe network is clean and correctly fitted with all joints correctly seated and sealed (except the endcaps and the pipe which enters the detector which must not be glued). Ensure that the relevant pipes are selected as in use in Xtralis VSC.
2. Check that the power is connected and on. Let the detector run for around 15 minutes, ensuring that the pipe flow rates comply with the minimum requirements listed in Section 4.1. Ignore the faults during this time. Reset the detector after 15 minutes of operation.
3. Normalize the airflow. This takes approximately 10 minutes. The pipe flow rates should now be close to the ASPIRE predictions.
4. Reset the detector after normalization. It should now be running without faults, providing the flow rates are maintained as indicated in Section 4.1.

It is important that the protected environment is working under normal operating conditions when operating the AutoLearn processes.

For code-specific information, see Codes and Standards Information for Air Sampling Smoke Detection on page iii.

6.1 AutoLearn Smoke

AutoLearn Smoke is initiated by using Xtralis VSC or the LCD Programmer.

During the AutoLearn Smoke process, the detector determines the average smoke and peak smoke obscuration levels and sets suitable alarm thresholds for the operating environment. This process will minimize nuisance alarms due to normal environmental background variations.

During the learning cycle, if an alarm condition occurs, AutoLearn will not complete its cycle. In this situation the user must restart the AutoLearn process. If AutoLearn is halted, the alarm thresholds will be left at the previous settings.

Conditions experienced during learning are assumed to be representative of normal operating conditions.

The AutoLearn Smoke learning times range from above 15 minutes to 16 days, with the default being set to 14 days.

If AutoLearn is running during the changeover period from Day to Night Thresholds, make sure that AutoLearn runs for at least an hour in both the Day and Night periods.

Table 6-1: AutoLearn Smoke range

Alarm Level	AutoLearn Smoke Range
Alert	0.05%–1.990% obs/m (0.016% - 0.6218% obs/ft)
Action (Pre-Alarm)	0.1%–1.995% obs/m (0.031% - 0.6234% obs/ft)
Fire1 (Alarm)	0.15 %–2.0% obs/m (0.047% - 0.625% obs/ft)
Fire2	0.155 %–20.0% obs/m (0.05% - 6.25% obs/ft)

For code-specific information, see Codes and Standards Information for Air Sampling Smoke Detection on page iii.

6.2 AutoLearn Flow

AutoLearn Flow process is initiated within Xtralis VSC.

During the AutoLearn Flow process, the detector determines the average and peak air flow levels monitored over time and sets suitable air flow thresholds that will not give rise to nuisance flow faults due to normal flow variations. The system will normalize the flow and then monitor the flow trend to set the flow fault thresholds.

During the learning cycle, if a flow fault is reached, AutoLearn will not complete its cycle. In this situation the user must restart the AutoLearn process. If AutoLearn is halted, the flow thresholds will be left at the previous settings.

Conditions experienced during learning are assumed to be representative of normal operating conditions.

The AutoLearn Flow learning times range from 15 minutes to 16 days, with the default being set to 14 days.

6.3 Commissioning Smoke Test

It is recommended that a smoke test be carried out to verify the integrity of the pipe network, to demonstrate that the system is working and to measure the transport time to the detector.

This test involves introducing a smoke sample at the furthest sampling hole and then measuring the time taken for the smoke to travel to the detector. Results are logged and compared to subsequent tests to note variations of the system.

Refer to the VESDA Commissioning Guide for details of the commissioning smoke test.

7 Maintenance

To maintain the VLI detector at its peak performance level, the recommended maintenance schedule shown in Table 7-1 below should be followed.

Table 7-1: Recommended maintenance schedule for the VLI detector

Maintenance Activity	Each Visit	Quarterly	Six Monthly	Annual
Run Clean Air Zero	✔			
Check Power Supply and Battery		✔		
Check Pipe Network			✔	
Pipe Integrity Smoke Test				✔
Check Pipe Flow				✔
Clean Sampling Point				✔
Flush Pipe Network				✔

Notes:

- The above maintenance steps are preventative maintenance. The VLI detector is intelligent and will therefore raise appropriate faults when a part requires replacement.
- Maintenance can be conducted by the original installer or an authorized distributor or service contractor.
- The required frequency of maintenance checks may vary depending upon local codes and standards and the environment of the installation.

Caution: While the detector or zone is disabled, no fire warnings will be annunciated by the detector. Prior to any maintenance or testing:

- Inform appropriate supervising authority about the risk associated with isolating a detector or zone.
- Check to see if the detector is also being used by a third party.
- Ensure that any ancillary devices dependent on the detector are isolated before work commences.

Attention : Lorsque le détecteur est hors service, il n'émet aucun avertissement d'alarme. Avant toute opération de maintenance ou de test :

- informez l'autorité de surveillance appropriée du risque associé à la mise hors service du détecteur ou à l'isolation de la zone ;
- vérifiez si le détecteur est également utilisé par un tiers ;
- assurez-vous que tout appareil auxiliaire dépendant du détecteur est mis hors service avant de commencer l'intervention.

7.1 Set the Detector to Standby

Setting the VLI to Standby mode deactivates the aspirator and stops all signaling.

To set the detector to Standby mode, select Go to Standby from the Device menu. The Disabled LED will blink and the aspirator will turn off.

To re-activate the unit, select End Standby from the Device menu.

7.2 Remove the Front Cover

Several maintenance functions require that the front cover be removed from the VLI detector in order to perform them. The front cover is held on by four captive screws. It may be removed by turning the screws counter-clockwise.

Caution: Electrostatic discharge (ESD) precautions need to be taken prior to removing the front cover from the detector in order to prevent damage to sensitive electrical components within the VLI detector.

Attention : Des précautions quant aux problèmes d'électricité statique doivent être prises avant de déposer la face avant du détecteur, pour éviter tout endommagement des composants électriques du VLI.

Warning: EXPLOSION HAZARD. DO NOT DISCONNECT EQUIPMENT WHEN A FLAMMABLE OR COMBUSTIBLE ATMOSPHERE IS PRESENT.

Avertissement : RISQUE D'EXPLOSION. Ne pas déconnecter l'équipement en présence d' UN COMBUSTIBLE ou d'une ATMOSPHÈRE inflammable.

Remove the Front Cover

The front cover is held on by four captive screws and a tether. It may be removed by turning the screws counter-clockwise.

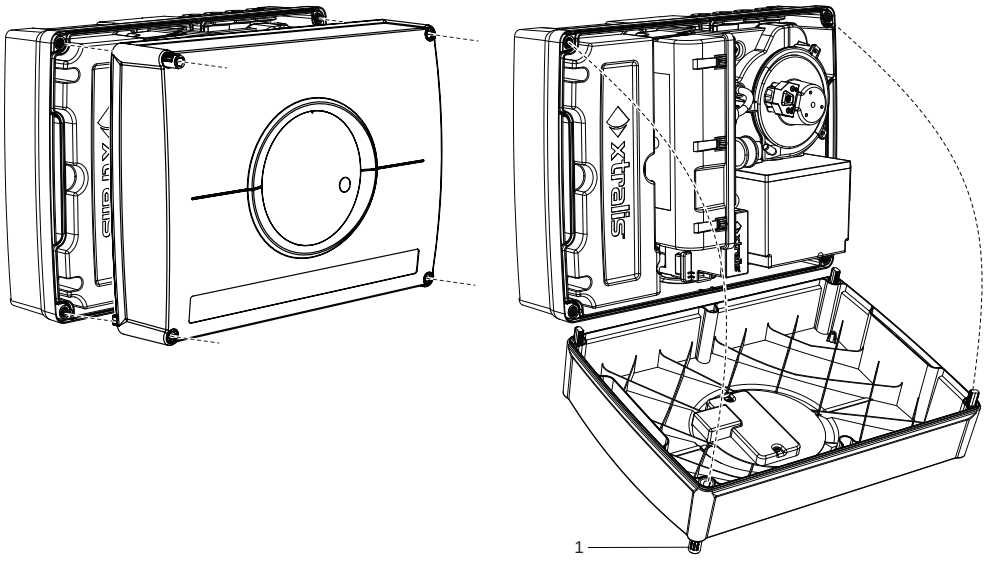


Figure 7-1: Front cover removal

7.3 Replacing the Intelligent Filter

The detector constantly monitors the difference between the flow of filtered and un-filtered air into the manifold. The flow of filtered air decreases when compared to that of un-filtered air as dirt and other particles accumulate in the Intelligent Filter. Although it is recommended to replace the Intelligent Filter every two years, environmental conditions dictate the actual frequency of Intelligent Filter replacement.

The detector reports a fault condition that requires replacement of the Intelligent Filter when the flow of filtered air falls below the minimum threshold when compared to the flow of un-filtered air.

Remove the Intelligent Filter

1. Set the detector to Standby mode. Refer to Section 7.1 for further information.
2. Remove the front cover. Refer to Section 7.2 for further information.
3. Unclip the Intelligent Filter (A) by pulling the locking lever outward (B).
4. Remove the Intelligent Filter.

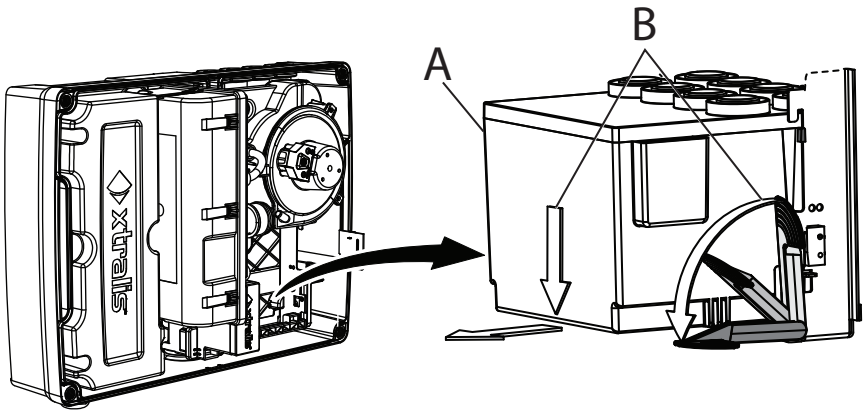


Figure 7-2: Intelligent Filter Removal

Reinstall the Intelligent Filter

1. Position the Intelligent Filter inside the detector, aligning the locking tabs (A) to the slots (B).
2. Push the locking lever in the direction of arrow (C) until it clicks into the locked position and the Intelligent Filter Present Switch (D) is actuated.
3. Execute the "Reset Intelligent Filter Life" command using Xtralis VSC. Refer to Section 5.4 for further information on this command.

Caution: Do not reinstall a used filter.

Avertissement : Ne réinstallez pas un filtre usagé.

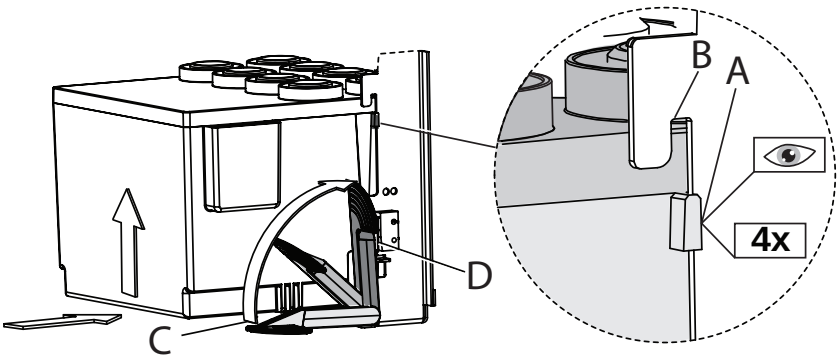


Figure 7-3: Intelligent Filter Installation

7.4 Replacing the Secondary Foam Filter

To maintain the operational integrity of the detector, it is recommended that the Secondary Foam Filter be replaced every 4 years, or when a filter fault occurs. It may be necessary to replace the filter more often where the detector is installed in environments that experience high levels of contamination.

Remove the Secondary Foam Filter

1. Set the detector to Standby mode. Refer to Section 1.1 for further information.
2. Remove the front cover. Refer to Section 7.2 for further information.
3. Remove two secondary foam filter screws (A).
4. Remove the secondary foam filter (B).

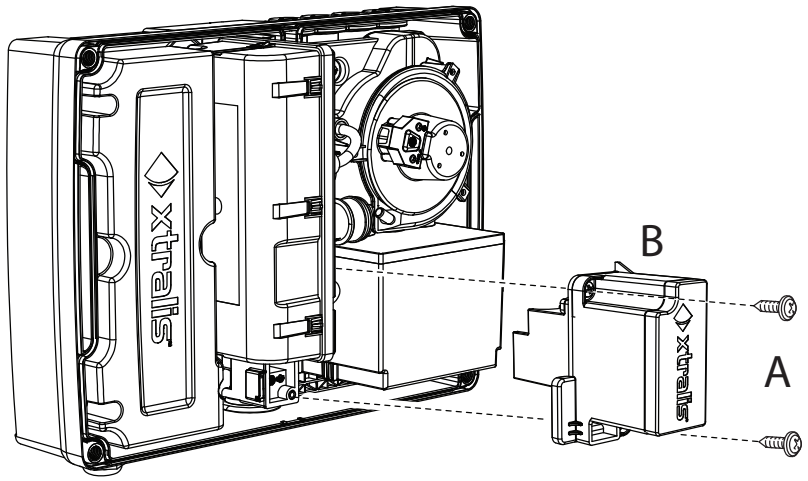


Figure 7-4: Secondary Foam Filter Replacement

Reinstall the Secondary Foam Filter

To reinstall the Secondary Foam Filter, follow the removal procedure in reverse order and execute the "Reset Secondary Filter Life" command in Xtralis VSC.

Caution: Do not reinstall a used filter.

Avertissement : Ne réinstallez pas un filtre usagé.

7.5 Replacing the Aspirator

Ensure the area surrounding the aspirator is clear of dirt and debris prior to replacement.

Care must be taken during aspirator replacement. The aspirator must be correctly seated; this is essential to ensure gaskets are not damaged or dislodged from the underside of the aspirator.

Remove the Aspirator

1. Set the detector to Standby mode. Refer to Section 7.1 on page 53 for further information.
2. Remove the front cover. Refer to Section 7.2 on page 54 for further information.
3. Power down the detector by removing the 24V input. Refer to Section 3.2.2 on page 21 for further information.
4. Remove the Intelligent Filter (Figure 7-5). Refer to Section 7.3 on page 55 for further information.

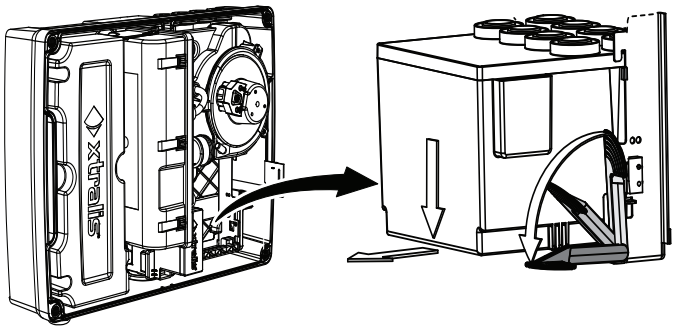


Figure 7-5: Intelligent Filter Removal

5. Remove the three Aspirator screws (A) and the two screws on the exhaust port (B).
6. Remove the Aspirator (C).

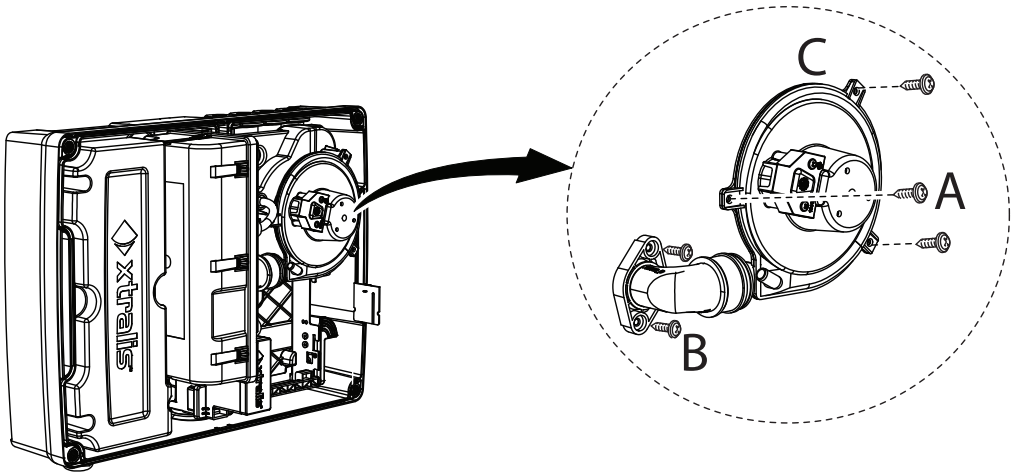


Figure 7-6: Aspirator Replacement

7. Flip the aspirator and disconnect the Aspirator cable.

Reinstall the replacement Aspirator

1. Ensure that the 24V input is still disconnected.
2. Connect the aspirator cable.
3. Install the new aspirator (C), the three aspirator screws (A) and the two screws on the exhaust port (B).
4. Reinstall the Intelligent Filter. Refer to Section 7.3 on page 55 for further information.
5. Power up the detector by reattaching the 24V supply.
6. Wait approximately 10 minutes to ensure that the detector does not report any fault conditions.
7. Perform a smoke test and ensure detector response is as per commissioning data.
8. If the replacement aspirator is brand new, execute the "Reset Aspirator Life" command in Xtralis VSC.

7.6 Replacing the Detection Chamber Assembly

Notes:

- It is important to precisely follow the sequence below in order to avoid kinking the tubes
- Remove the longer tube near the secondary filter first, followed by the shorter tube near the aspirator.

Requirements

- Philips head screwdriver
- 10mm spanner or flat-blade screwdriver

Remove the Detection Chamber Assembly

1. Set the detector to Standby mode. Refer to Section 7.1 on page 53 for further information.
2. Remove the front cover. Refer to Section 7.2 on page 54 for further information.
3. Power down the detector by removing the 24V input. Refer to Section 3.2.2 on page 21 for further information.
4. Remove the Intelligent Filter (Figure 7-7). Refer to Section 7.3 on page 55 for further information.

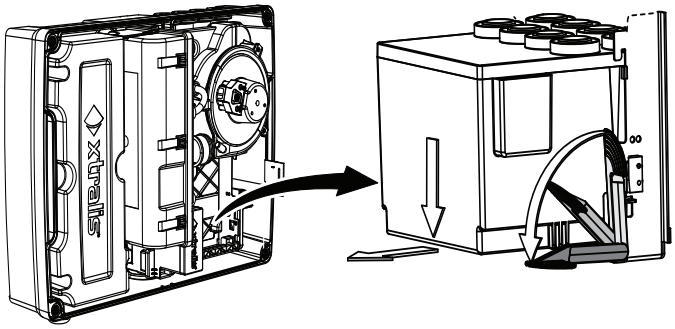


Figure 7-7: Intelligent Filter Removal

5. Remove the two screws (A) holding the chamber (Figure 7-8).

Figure 7-8: Remove Chamber Mounting Screws

6. Use a 10mm spanner or a large flat bladed screwdriver to press down on the black ring near the secondary filter (B) whilst simultaneously using the other hand to remove long tube (Figure 7-9).

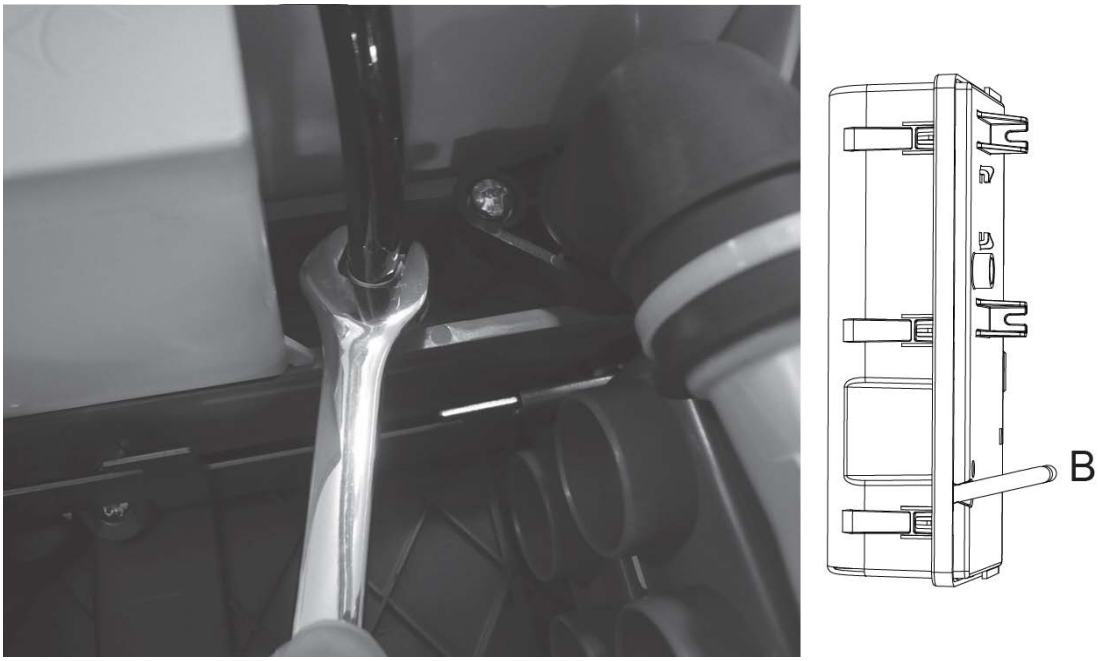


Figure 7-9: Remove Long Tube

7. Repeat the step above on the black ring (C) near the aspirator to remove the shorter tube (Figure 7-10).

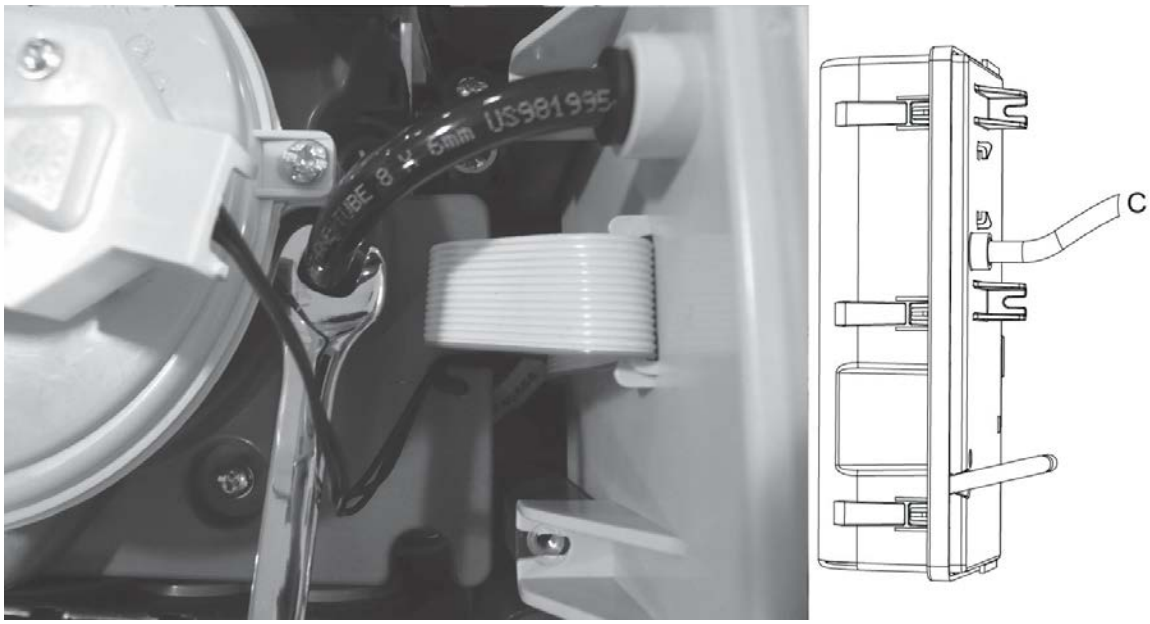


Figure 7-10: Remove Short Tube

8. Gently remove the Chamber. To prevent the tube from kinking, lift the chamber while removing the tube (Figure 7-11).

Figure 7-11: Lift Chamber

9. Unlock the connection arms and disconnect the ribbon cable from the main board (Figure 7-12).

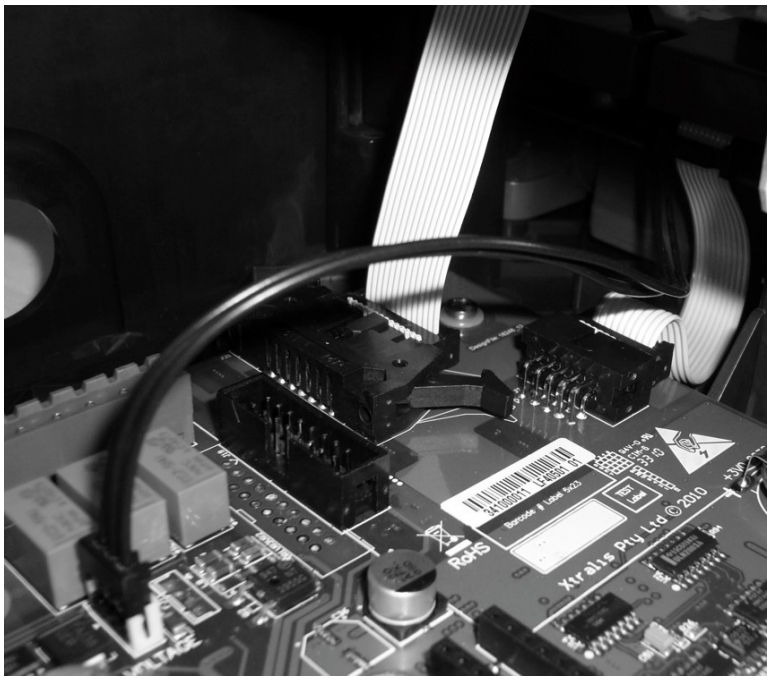


Figure 7-12: Disconnect Ribbon Cable

Install a new Chamber Assembly

1. Ensure that the 24V input is still disconnected.
2. Plug the ribbon cable from the chamber into the main board (Figure 7-12). Ensure that the cable connector is fully in and arms are locked.
3. Fold the ribbon cable under the chamber and hook it on the tabs provided (Figure 7-13).

Figure 7-13: Ribbon Cable Hooks

4. Insert chamber in slots but hold the chamber 20mm from bottom (Figure 7-14).

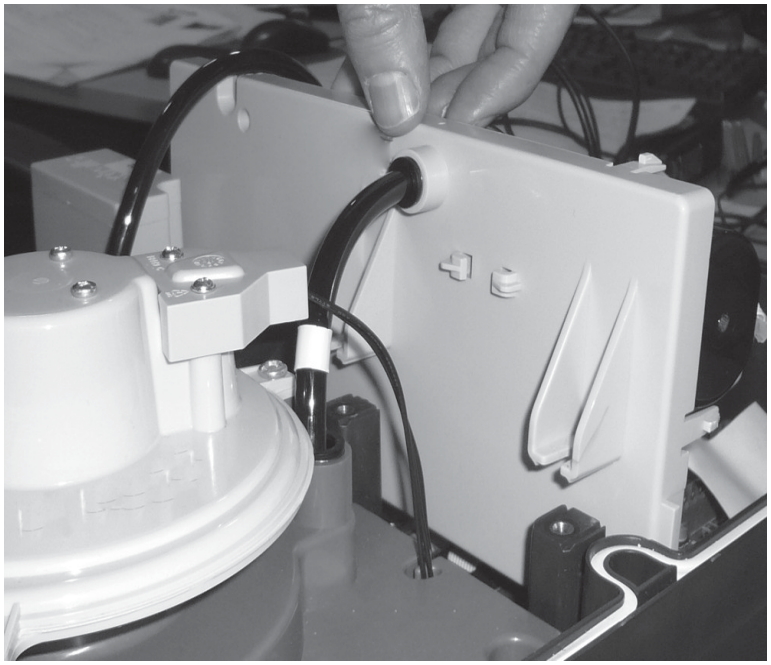


Figure 7-14: Insert Chamber

5. Insert the short tube into the Cartsick connector under the fan and lower the chamber while inserting (Figure 7-15).

Figure 7-15: Lift Chamber

6. Insert the short tube until the white tape touches the black ring on the Carstick connector (Figure 7-16).

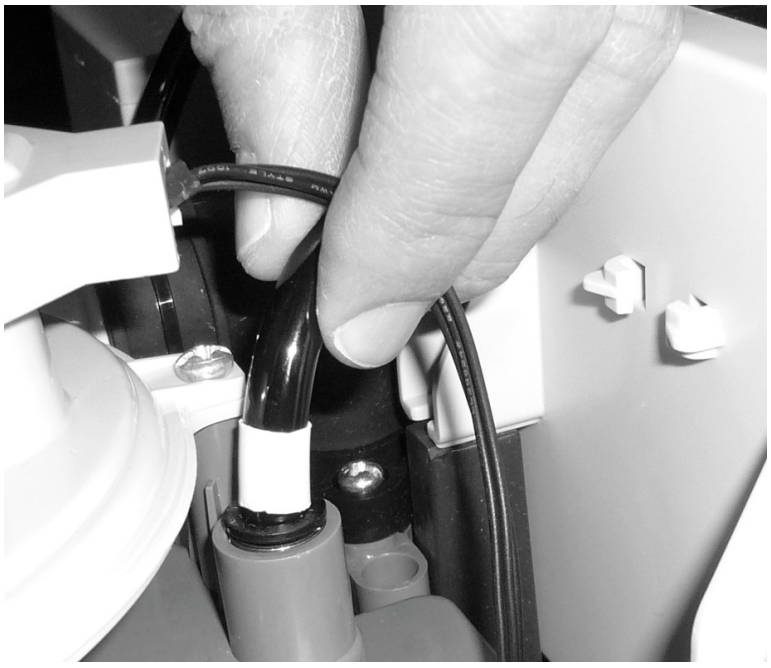


Figure 7-16: Insert Short Tube

7. Insert the long tube near the Secondary Foam Filter Carstick connector and lower the chamber whilst inserting (Figure 7-17).

Figure 7-17: Insert Long Tube

8. Insert the long tube until the white tape touches the Carstick connector.

Figure 7-18: Complete Long Tube Insertion

9. Insert the two chamber screws (Figure 7-8).
10. Reinstall the Intelligent Filter. Refer to Section 7.3 on page 55 for further information.
11. Power up the detector by reconnecting the 24 Volt input.
12. Wait approximately 10 minutes to ensure that the detector does not report any fault conditions.
13. Perform a smoke test and ensure detector response is as per commissioning data.

7.7 Spare Parts

Gray-colored internal components such as the Intelligent Filter, Secondary Foam Filter, Detection Chamber and Aspirator are field-replaceable.

Table 7-2: Suggested spare parts stock

Part No.	Description
VSP-030	VLI Intelligent Filter
VSP-031	VLI Secondary Foam Filter
VSP-032	VLI Aspirator
VSP-033	VLI Chamber Assembly
VSP-034	VLI VESDAnet Card
VSP-035	VLI Remote Display Module Spare
VSP-036	VLI Ultrasonic Flow Manifold Spare

8 Troubleshooting

If the VLI detector identifies a fault condition, the Fault LED on the front of the detector illuminates and an event containing details of the condition is written to the active event list.

Tools such as the LCD Programmer or the Xtralis VSC software must be used to obtain specific information on the event to enable further investigation and correction of the fault. The Xtralis VSC Online Help contains descriptions of each fault and recommended corrective actions.

8.1 Fault Reporting through Relays

VESDA devices are often interfaced with Fire Alarm Control Panels (FACPs) or building management systems (BMS) via relays. In such instances the fault relays signal a fault condition to the FACP or the BMS. It would be necessary to use an LCD Programmer or Xtralis VSC software to further investigate the fault.

8.2 Troubleshooting with Xtralis VSC

The Xtralis VSC software displays faults in the active event list as they occur. The list displays the date and time of the fault, the serial number of the device on which the fault has occurred, the zone number, fault number, and a description of the fault.

For detailed information about a fault, access the device tree menu, highlight the device, and select device information. This will display the details of the fault.

The fault is removed from the active event list once the it is cleared.

8.3 Troubleshooting with a Remote Display

If a Remote Display unit is connected to the detector, the specific fault type will be indicated on the Remote Display. The fault types shown on the display are listed below in Table 8-1.

Table 8-1: Fault Types indicated by the Remote Display

Fault Type	Description
Urgent	A serious fault requiring immediate attention.
System	A fault affecting the network.
Zone	A Zone fault in the display module.
Power	If the monitored GPI Function is used, and this LED is lit it indicates a fault in the power supply,
Network	A communications fault on VESDAnet.
Airflow	Higher or lower than acceptable levels of air flow through the inlet pipe.
Filter	An air filter requires changing.

Note: It is normal for a new system to indicate airflow faults. These are rectified as part of the setup and commissioning process.

8.4 Troubleshooting with an LCD Programmer

The LCD Programmer reports individual device faults. The faults are reported in the status screen and are clearly identified with a “F” icon against the fault. Details of the faults can be interrogated through the “status” option of the respective device.

For further details please refer to the LCD Programmer Product Guide.

8.5 Overcoming Connection Issues on Ethernet

Connecting VLI on existing ethernet network may cause contention on the network due to duplication of the MAC address. This problem is encountered when VLI detectors are connected on different switches on the corporate network. This issue is due to BACnet protocol limitation, which is outside Xtralis' control. The following solutions are recommended to resolve the issue.

1. Keep all the VLI detectors on the same switch. The user may have VLIs covering a very large area and it may not be feasible for them to run network cables to cover the large areas on a single switch.
2. Network the detectors wirelessly. Each VLI detector is connected to wireless network via a wireless MOXA converter (NPort W2150A) .
3. Connect VLI to ethernet via Moxa server. Each VLI detector may be connected to corporate network via a HLI (VHX-1200) and MOXA Ethernet to Serial converter (NPort 5150A).

A Commissioning Forms

This is the main commissioning form for each customer site.

Table A-1: VESDA commissioning form

Customer Name	
Site Address	
Installer (Name & Contact)	
Commissioner (Name & Contact)	

Checks	**Date:**
1. Wiring Checked 2. Detector Diagnostics 3. Display Diagnostics 4. Test Relay	1. 2. 3. 4.

Client Representative Name	
1. Test witnessed by:	Date:

Hand Over Documents	
1. Copy of this form 2. ASPIRE Installation Data Pack 3. ASPIRE Bill of Materials 4. Commissioning form or printout from Xtralis VSC or Xtralis VSM4 for each detector 5. Commissioning form or printout from Xtralis VSC or Xtralis VSM4 for each display module 6. Smoke test results 7. Forms required for compliance with local codes and standards	

Customer's Signature	**Date:**
Commissioner's Signature	**Date:**

A.1 VLI Detector Commissioning Form

For all VESDAnet systems, highlight the device, the zone or VESDAnet then select **File > Print to file**.

Table A-2: VLI Detector commissioning form

Address (Zone)	
VESDA Zone Name	
Module Type	VLI-
Firmware Version	
Card Inserted	VESDAnet Interface Card or None

Alarm Thresholds		
Day	Action (Pre-Alarm)	
	Fire1 (Alarm)	
Day/Night Changeover	Enable / Disable	
	Day starts:	
	Night starts:	
Night	Action (Pre-Alarm)	
	Fire1 (Alarm)	
Delay	Action (Pre-Alarm)	
	Fire1 (Alarm)	

Significant Smoke		
Instant Fire	Enable / disable	
Secondary Foam Filter	Service Period:	
Reference Detector	Address Zone:	
	Dilution%	
	Delay (seconds)	
Flow Threshold	High Major%	
	High Minor%	
	Low Minor%	
	Low Major%	
	Delay (seconds) Networked	
	Flow Averaging Period (sec) Networked	
Airflow		
Raw Flow		L/min
% Flow		%
Maximum Transport Time observed		sec.

A.2 Display/Relay Configuration

Table A-3: Display/Relay Configuration commissioning form

Button Lockout	Enabled/Disabled
Smoke Test	
Reset	
Disable	
AutoLearn Smoke	
AutoLearn Flow	
Relays Connected	Yes/No
GPI Connected	Yes/No
GPI Function	

A.3 Relay Configuration

Table A-4: Relay Configuration commissioning form

Relay	**1**	**2**	**3**	**4**	**5**	**Start-up**	**Latching**
Fault	✔						
Fire		✔					
Configurable			✔				
Configurable				✔			
Configurable					✔		

D= Normally De-energized; E= Normally Energized

A.4 VESDAnet Interface Card

Table A-5: VESDAnet Interface Card commissioning form

VESDAnet Card Installed	Yes/No
Card Serial Number	
Preferred Port	Port A/Port B
Loop Open Ended on this card	Yes/No

A.5 ASPIRE Data

Table A-6: ASPIRE Data commissioning form

	Group 1	**Group 2**	**Group 3**	**Group 4**
Aggregate Sensitivity				
Balance				
Suction Pressure (least)				
Endcap Sensitivity Factor				
Pipe Flow Rate (L/min)				

A.6 Smoke Test

Table A-7: Smoke Test commissioning form

Test Results	
Test Method	
Type of Smoke	
Test Date	

A.7 Air Sampling Test Results

Table A-8: Air Sampling Test results commissioning form

		Pipe 1	**Pipe 2**	**Pipe 3**	**Pipe 4**
	Transport Time from End Cap Hole				
Test 1	Initial Response				
	Action (Pre-Alarm)				
	Fire1 (Alarm)				
	Peak Smoke				
Test 2	Initial Response				
	Action (Pre-Alarm)				
	Fire1 (Alarm)				
	Peak Smoke				

B FM Hazardous Location Installations

The VESDA VLI can be mounted onto the wall using the mounting bracket on any suitable secure surface.

The diagram below (Figure B-1) demonstrates that the VESDA VLI detector and sampling pipe network should be positioned inside the classified area and connected to other equipment located outside the classified area with suitable wiring.

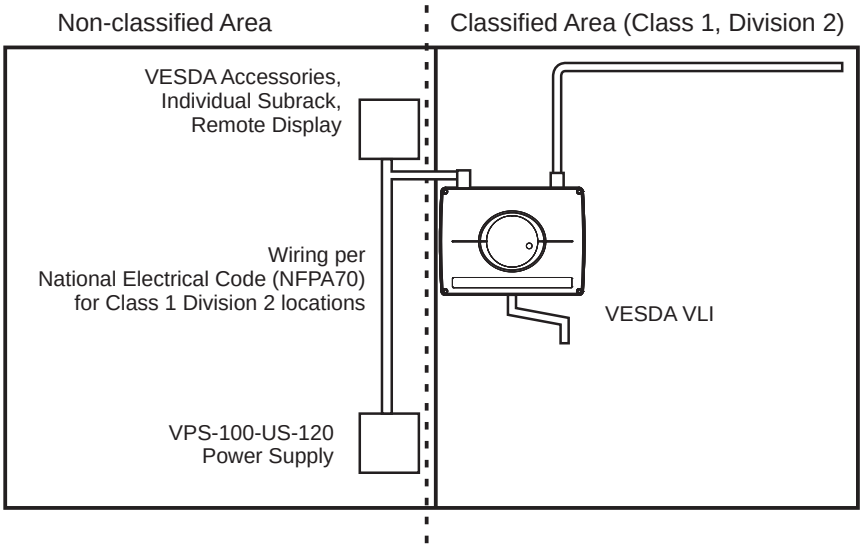


Figure B-1: Installation Overview

Notes:

- For a Class 1 Division 2 installation, the detector, sampling network and exhaust must be located within the same protected area.
- FM approval requires the use of a VPS-100US-120 power supply unit for Class 1 Division 2 installations.
- The VPS-100US-120 and any VESDA accessories are required to be mounted outside of the classified area.

The design of the VESDA VLI allows for the detector to be inverted, i.e. with the air inlet at the bottom and the air exhaust port at the top, when viewed from the front. This is made possible since both the internal plastic and external stainless steel front covers can be fitted either way up, so that no matter which way up the detector is mounted, the detector face will have the correct orientation.

Note: The detector can only be mounted using the mounting bracket included in the packaging.

C Glossary

Table C-1: Glossary

	Term	Description
A	Aspirator	Impeller type fan used to draw sampled air into the detector.
	AutoLearn Smoke	A feature which allows the detector to learn its environment (background pollution, differences between day and night operations within the facility etc) in order to set appropriate alarm thresholds for that environment.
	AutoLearn Flow	A feature which allows the detector to learn its environment (airflow patterns, differences between day and night operations within the facility etc) in order to set appropriate airflow thresholds for that environment.
B	BACnet	The data communications protocol used on the USB and Ethernet ports.
C	Capillary Tubes	Flexible tubes attached to the sampling pipe network for sampling specific areas or objects away from the sampling pipe.
	Commissioning	The process of making a smoke detection system operational.
D	Disable	Disables the alarm relay outputs from actuating and indicates a fault. This is previously referred to as Isolate.
E	Event Log	All VESDA detectors provide internal data logging of events which have occurred in the protected zone.
F	Fire	This indicates a serious situation and may lead to automatic generation of a fire alarm.
	Fire Alarm Control Panel (FACP)	A panel which all fire detection products report their status to.
G	General Purpose Input (GPI) Unmonitored	An input to a detector which can be used to place the detector in a certain condition. Applying a voltage between 5V and 30VDC triggers the selected condition.
	General Purpose Input (GPI) Monitored	An input to a detector which is monitored for open or short circuits. It can be used to monitor the power supply.
H	High Airflow Environment	Where there are 10 or more air exchanges per hour.
	High Level Interface (HLI)	A communications interface between a VESDA device and other pieces of equipment using VESDAnet or another communications protocol.
O	Obscuration	The reduction in light transmission per meter or per foot due to the presence of particulates.
R	Referencing	Referencing is a technique used to reduce false alarms. It requires VESDAnet. A separate detector takes readings of the background level of smoke and pollutants outside of the protected area. These readings are then referenced to the readings from the detectors in the protected area. This allows the internal detectors to determine if a rise in smoke levels is due to background pollution or a problem inside the protected area.
	Relay	A device on a detector which allows external equipment to be hard wired to it and be triggered when various conditions occur (example, sounding a siren at Alert threshold).

Table C-1: Glossary (continued...)

	Term	Description
S	Sampling Network	The pipe network constructed to allow the VESDA detector to draw air for sampling.
	Sensitivity	Degree of response (i.e. activation of alarm condition) of a detector. A high sensitivity denotes response to a lower concentration of smoke than a low sensitivity.
Z	Zone	A defined area within the protected premises from which an alarm signal can be received.

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