VESDA VLC

Product Guide

VLC-500

VLC-505

December 2013

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Part Number: 18938

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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 VLC Product Guide is written to provide you with comprehensive knowledge of the detector.

This guide introduces you to the VESDA VLC detector features and 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 guide has knowledge and the appropriate certification from the 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 The information below was correct at time of printing but may now be out of date, check with your local codes, standards and listings for the current restrictions.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 instructions, 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

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”.

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.

ONORM F3014

ONORM F3014, transport times for all tubes (including capillaries) must not exceed 60 seconds from any hole. This means that the predesigned pipe networks that include capillaries cannot be used.

AS1603.8

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 ASPIRE2 approves alterations before making any changes.

ASPIRE2 is available from your VESDA ASD distributor.

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 ASPIRE2 calculation software is required to verify system design performance with all devices included in the design.

European Installations

The product must use a power supply conforming to EN54: Part 4.

EN54-20

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 ASPIRE2 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 flow through the detector predicted by ASPIRE2 should be in the range 20 to 65 lpm

Additional information:

- Class A detectors passed EN 54-20 approvals testing with 30 holes and 0.05% obscuration/m detector sensitivity
- Class B detectors passed EN 54-20 approvals testing with 36 holes and 0.09% obscuration/m detector sensitivity
- Class C detectors passed EN 54-20 approvals testing with 40 holes and 0.165% obscuration/m detector sensitivity

Approvals

- UL
- ULC
- FM
- LPCB
- VdS
- CCC
- ActivFire
- NF (Système de Sécurité Incendie – www.marque-nf.com)
- VNIIPO
- CE - EMC and CPD
- EN 54-20

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

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Table of Contents

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1 Introduction

The VESDA VLC is an aspirating smoke detector providing very early warning of fire conditions by drawing air samples through an air sampling pipe network. The detector chamber can detect the presence of smoke at very low concentrations. The embedded and PC software complimenting the VESDA VLC provides a wide range of user defined parameters and reporting capabilities. The detector easily interfaces with fire warning and fire suppression release systems, and can be easily integrated into a building management or digital control system.

1.1 Configurations

The VESDA VLC is available as:

- Relays Only (RO) model (VLC-500) - for stand alone VESDA VLC
- VESDAnet (VN) model (VLC-505) - for networked VESDA VLC

Figure 1-1: VLC-505 detector

1.2 Features

The VESDA VLC features make it an ideal smoke detector for protecting small environments and individual objects:

- Reduced size compared to VLP and VLS detectors
- Wide sensitivity range
- Each detector can cover an area of up to 800 m² (8000 sq. ft.)
- Up to three programmable alarm thresholds
- Programmable relays
- AutoLearn feature
- One pipe inlet that can be split into multiple pipes
- Clean air barrier for optics protection
- Option for inverted mounting
- High efficiency aspirator
- Airflow monitoring
- Optional remote display and relay capability
- Active fault monitoring
- Easy cable termination
- Event log to 12000 events
- RO Version: Relay Only version for stand alone VESDA VLC
- VN Version: VESDAnet (VN) version for networked VESDA VLC
- Remote modules available (VN version only) to meet site specific requirements
- General purpose input with three programmable functions
- PC capable programming and monitoring

2 Operation

An air sampling pipe network collects air samples from a protected area. The integrated aspirator draws air into the sampling pipes through a pipe inlet manifold. For further information on air sampling pipe networks please see the Pipe Network Design and Installation Manuals.

Some of this air flows to the dual stage filter. The first stage air filter removes dust and dirt from the sampled air after which the sample flows to the laser detector chamber which is designed to detect the presence of smoke.

Any smoke detected in the laser detection chamber is signaled to the main processor card. If the presence of detected smoke is higher than the set thresholds it is reported as a Pre-Alarm or an Alarm depending upon the alarm thresholds. The second stage filter further filters the air to produce ultra clean air. The ultra clean air is used to clean the optical surfaces in the laser detection chamber.

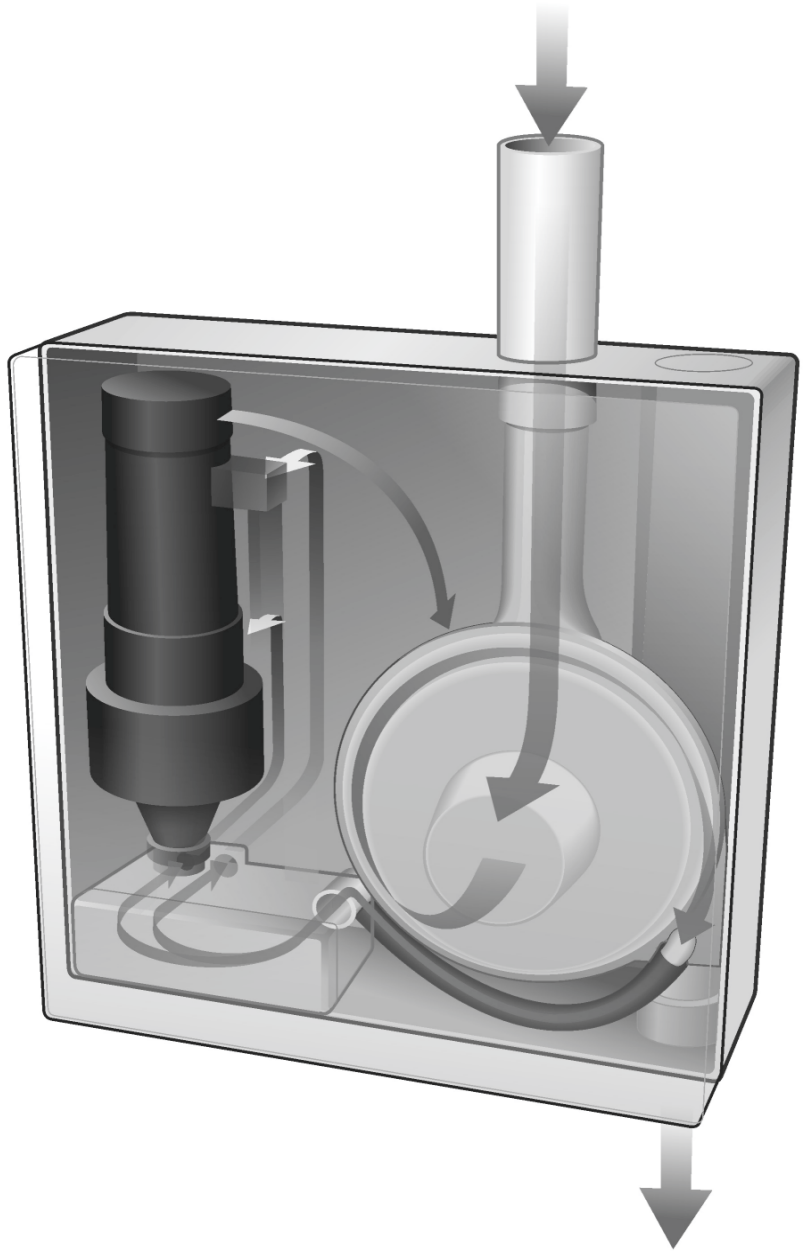


Figure 2-1: Operation and internal air flow of the VESDA VLC Detector

2.1 Display

The VESDA VLC has five LEDs to indicate Alarms, Faults, OK (normal working of the detector) and Reset/Isolate status. The VLC-505 offers the option for a remotely mounted Display Module. Refer to Figure 2-2 on page 5 for details.

2.1.1 LED and Reset/Isolate button

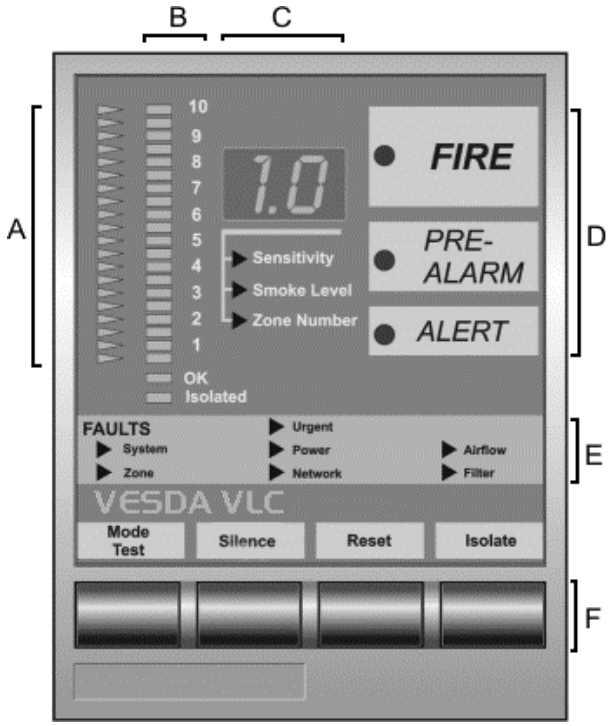
The LED indicators and the Reset/Isolate button on the front cover of the VESDA VLC detector display alarms and faults.

Table 2-1: LED Indicators and the Reset/Isolate button

Fire	This **(RED)** LED is lit when the Fire alarm threshold is reached.
Pre-Alarm	The **(RED)** Pre-Alarm LED is lit when the Pre-Alarm threshold is reached. This LED flashes when the Alert alarm threshold is reached and Alert Overlay in set to ON.
Fault	This **(YELLOW)** LED is lit when a fault is detected. It is also lit during airflow normalization.
OK	The OK LED **(Green)** stays lit during normal operation indicating the unit is functioning normally. This LED flashes twice repeatedly during air flow normalization operation and three times repeatedly when AutoLearn is activated.
Reset / Isolate **Reset / Isolate Push Button Switch**	The Reset/Isolate LED (Yellow) is lit when VESDA VLC is isolated. While it remains isolated the Pre-Alarm and Fire relays will not work. (The Fault relay will continue to work). • To Reset the unit, press this button once. • To Isolate the unit, press and hold the button for 2 seconds. • To de-isolate the unit, press and hold the button for 2 seconds. • While the detector is Isolated, any faults may be cleared by pressing this button once. The button will not operate: • if a remote Reset switch has been fitted to the Reset (GPI) terminals and is set to the Isolate position; OR • if the Reset/Isolate button has been locked out during programming.

2.1.2 Remote Display Module

The VLC-505 model has the option of being connected to a Remote Display Module mounted into a Mounting Unit or a 19" Subrack. Unlike the VLP and the VLS detectors, the display module cannot be mounted into the VESDA VLC.



Legend	
A	Threshold indicators
B	Bar graph
C	Numerical Display
D	Alarm Level LEDs
E	Fault LEDs
F	Push Button Keys

Figure 2-2: VRT-J00 Display Module mounted into a remote unit

Table 2-2: Remote Display Module

OK LED	The OK LED stays lit during normal operation indicating the unit is functioning normally. When this LED is off a warning beep will sound indicating a Fault condition is active.
Isolate LED	This LED is lit when the detector is Isolated and the alarm relays are de-activated disabling the alarm outputs of the detector. A warning sounder will beep every 60 seconds if the display has been programmed to act in this way.
Alarm Levels	**ALERT:** When illuminated this LED indicates that the smoke level is above the alert threshold. This indicates the detector has identified the very early stages of a fire condition and/or that the smoke level in the area is above normal. **PRE-ALARM:** When lit this indicates that the detected smoke level has passed the threshold value fixed for Pre-Alarm, but is not intended to initiate a general fire alarm response procedure. **FIRE:** When lit this indicates that there is enough smoke to initiate a general fire alarm response procedure. This indicates a fire may be imminent or is in progress. When interfaced with a Fire Alarm Control Panel (FACP) it can generate an automatic fire alarm.
Bar graph	The Bar graph is a 20 step indicator where each indicator represents an increase in the detected level of smoke, relative to the preset fire alarm level.
Threshold Indicators	The illuminated LEDs represent visual indication of the settings for the ALERT, PRE-ALARM, and FIRE alarm levels.

Table 2-2: Remote Display Module (continued...)

Fault LEDs	**Urgent:** Indicates a serious fault requiring immediate attention. **System:** Indicates a fault in the network. **Zone:** Indicates a fault in the VESDA Zone monitored by the Display Module. **Power:** Indicates a fault in the power supply (If the GPI function is used). **Network:** Indicates a communications fault on VESDAnet. **Airflow:** Indicates abnormal air flow through the inlet pipe. **Filter:** This LED illuminates when the air filter requires changing.
Push Button Keys	These buttons enable various systems functions but can not be used to configure the system. The buttons can be disabled by the Systems Administrator. **Mode/Test (Dual Function):** Selects or toggles between the sensitivity, smoke level and zone number modes. When depressed for more than two seconds it performs a lamp test function. **Silence:** This button silences any alarm or fault warnings. It also stops the LEDs from flashing to acknowledge a fault or alarm condition. **Reset:** Resets any latched alarms and faults on the detector. Any active alarms or faults are reported again after the time delays have elapsed. **Isolate:** Isolates the detector from any external devices or systems (an isolate indication will normally be raised at the Fire Alarm Control Panel (FACP)). **Note:** It is normal practise to signal the Isolate condition to the Fire Alarm Control Panel (FACP) using the Isolate relay.
Numerical Display	**Sensitivity:** Shows the level of smoke that must be measured to illuminate the entire bar graph and always corresponds with the fire alarm level. **Smoke Level:** Indicates the current level of smoke in the relevant VESDA address and is represented as % obs/m or % obs/ft. **Zone Number:** This is the VESDA Zone number assigned to the Display Module. **Note:** The Mode Button is used to select the parameters represented by the Numeric Display (sensitivity, smoke level, zone number). The values displayed in the numerical display represent the current readings for that mode.

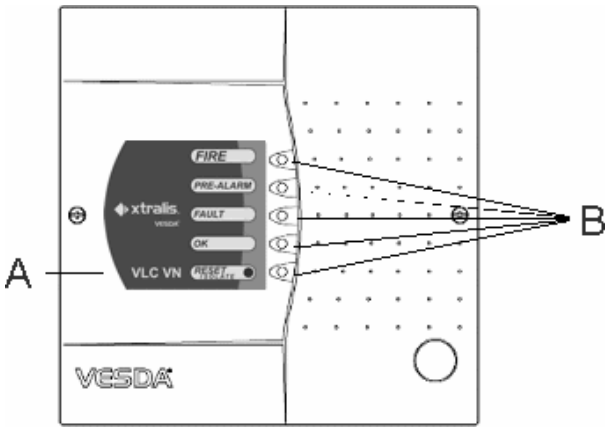
2.2 LCD Programmer

The LCD Programmer allows configuring, commissioning and maintenance of a VESDA system. For further information please see the LCD Programmer Product Guide. A hand-held programmer can be connected to the VESDA VLC VN Model (VLC-505). The VESDAnet socket and VESDAnet terminals can be found on the termination card and can be accessed by removing the front cover of the detector. A LCD Programmer mounted into a remote unit or a 19" Sub-Rack may also be used (for VLC-500 model refer to Section 6.1.3 on page 21).

Legend	
A	Display
B	Keys

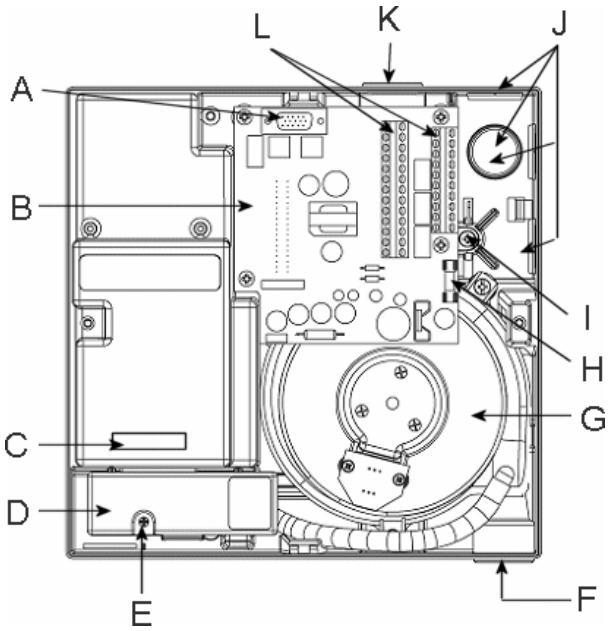
Figure 2-3: LCD Programmer

2.3 Product Configuration



Legend	
A	Reset / Isolate Button
B	LED Indicators

Figure 2-4: Front view of the VESDA VLC detector



Legend	
A	Programming socket 15 Pin for VLC-505 9 Pin for VLC-500
B	Termination card
C	VESDAnet number
D	Air filter cartridge
E	Filter screw
F	Air exhaust port
G	Aspirator
H	1.6 Amp fuse
I	Anti tamper screw
J	Cable entry ports
K	Air inlet port
L	Wire terminal strips

Figure 2-5: View of components in the enclosures box

3 Product Information

3.1 Specifications

Table 3-1: VESDA VLC detector specifications

Supply Voltage	18 to 30 VDC
Power Consumption	5.4 W during normal operation, 5.9 W with alarm on
Current Consumption	225 mA at 24 VDC normal operation, 245 mA with alarm on
Fuse Rating	1.6A
Dimensions (WHD)	225 mm x 22 5 mm x 85 mm (8 7/8 in x 8 7/8 in x 3 3/8 in)
Weight	1.9kg (4.2 lbs)
Operating Conditions (To operate the VLC detector outside these parameters please contact your nearest Xtralis Office)	• **Ambient:** 0°C to 39°C (32°F to 103°F) * • **Tested:** -10°C 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)	• **Humidity:** dry (<95%) • **Temperature:** 0° to 85° C (32°F to 185°F) • Must not exposed to sunlight or other radiation sources
Sampling Pipe Network	• **Maximum area of coverage:** 800 m² (8000 sq. ft.) • **Maximum Single Pipe Length:** 80 m (260 ft) (max. 40 holes) • **Maximum branched (2) Pipe Lengths:** 50 m (164 ft) each (max. 40 holes) • **Computer Design Tool:** ASPIRE2
Pipe Size	• **ID:** 15-21 mm (0.874 in) • **OD:** 25 mm (1.050 in.)
Relays	3 relays, contacts rated 2A @ 30 VDC Programmable to latched or non-latched states
Relays Default Configuration	• Fire • Pre-Alarm • Alert/Fault (Maintenance and Isolate) • Programmable 0 - 60 sec. time delay for each relay
IP Rating	IP30
Cable Access	4 x 25 mm (1 in) cable entries
Cable Termination	Screw terminal blocks (0.2-2.5 sq mm, 30-12 AWG)
Detector Resolution	0.005 to 20.00% obs/m (0.0015 to 6.25% obs/ft.)
Threshold Setting Range	• **Alert:** 0.005 - 1.990% obs/m (0.0015 - 0.6218% obs/ft.) • **Pre-Alarm:** 0.010 -1.995% obs/m (0.0031 - 0.6234% obs/ft.) • **Fire:** 0.015 - 20% obs/m (0.0046 - 6.25% obs/ft.) **
Key Software Features	• Event log: Up to 12000 events stored on FIFO basis. • (Volatile Event Log) Smoke level, alarms and faults with time and date stamp • AutoLearn: Minimum 15 minutes, maximum 15 days. (Recommended minimum period 1 day). • During AutoLearn thresholds are NOT changed from pre-set values.

* Product UL listed between 0° to 38°C (32° F to 100° F)

** Factory Default = UL268 = The upper range of the Fire threshold is limited to 12% obs/m (4% obs/ft.) to comply with UL268. If the factory default is off, the fire threshold can be set up to 20% obs/m (6.25% /ft.)

3.2 Dimensions

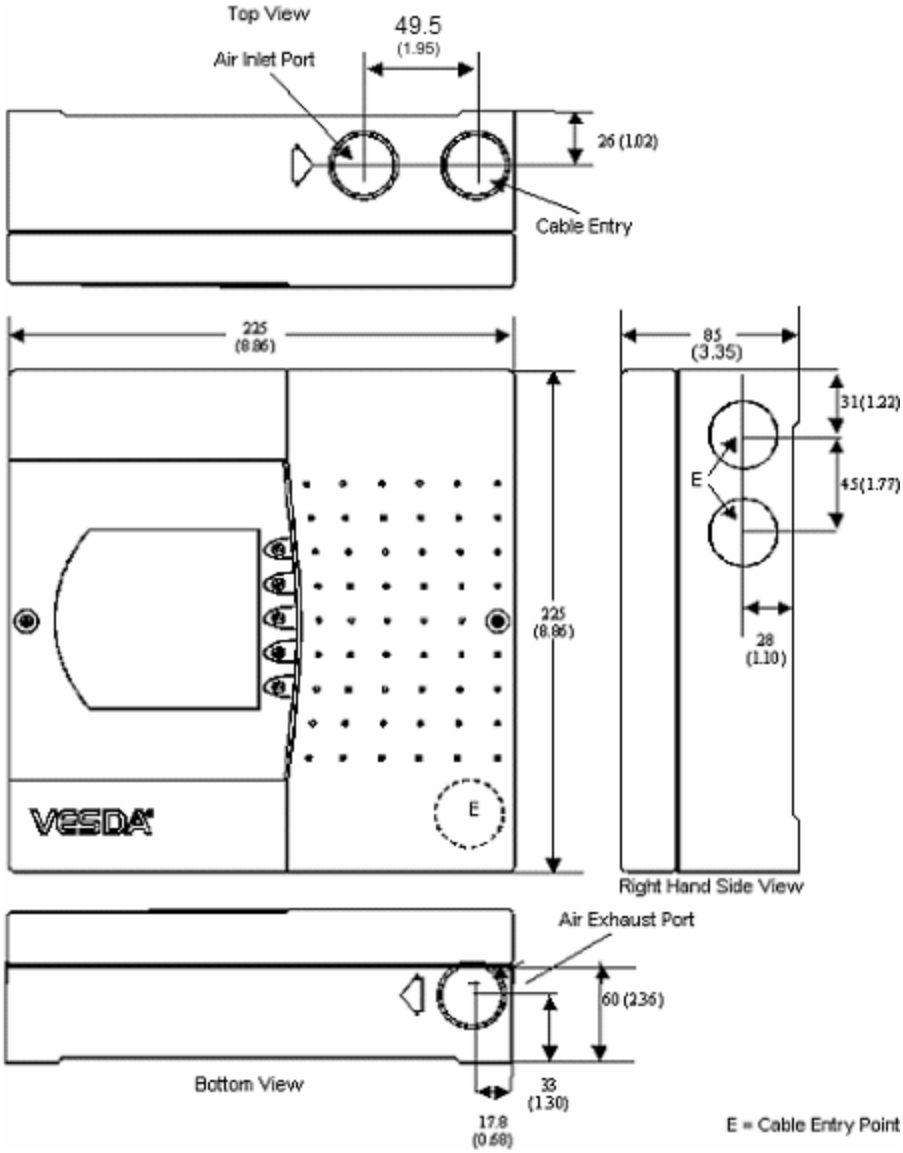
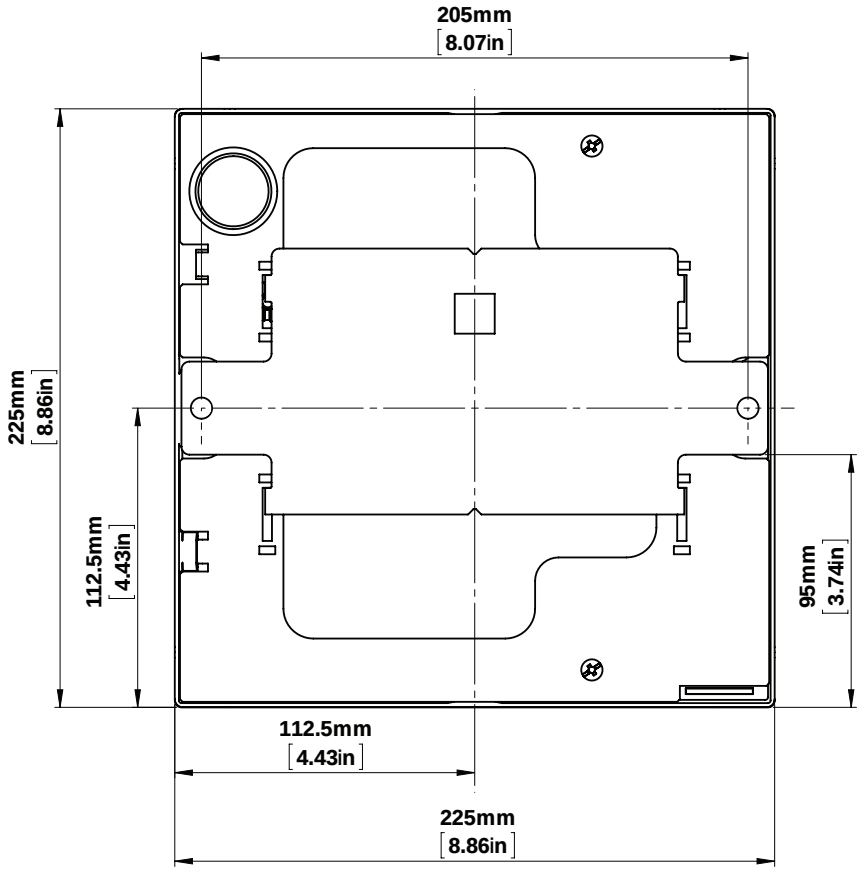


Figure 3-1: Dimensions in mm. (inches) for VESDA VLC



E = Cable Entry Port on rear of enclosure

Figure 3-2: VESDA VLC detector dimensions - rear view

3.3 Default Settings

Table 3-2: Default values for the VESDA VLC detector

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
Fire Threshold	0.2% obs/m (0.062% obs/ft)	0.015% obs/m (0.0046% obs/ft)	20% obs/m (6.25% obs/ft)	Adm
Pre-Alarm Threshold	0.14% obs/m (0.044% obs/ft)	0.010% obs/m (0.0031 obs/ft)	1.995% obs/m (0.6234% obs/ft)	Adm
Alert Threshold	0.08% obs/m (0.025% obs/ft)	0.005% obs/m (0.0015% obs/ft)	1.990% obs/m (0.6218% obs/ft)	Adm
Alarm Delays…Fire	10 Seconds	0 Seconds	60 Seconds	Adm
Alarm Delays…Pre-Alarm	10 Seconds	0 Seconds	60 Seconds	Adm
Alarm Delays…Alert	10 Seconds	0 Seconds	60 Seconds	Adm
Delay Times	Simultaneous	Simultaneous	Cumulative	Adm
Instantaneous Fire	Disabled	N/A	N/A	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	 • 130% • 120% • 80% • 70%	 • 105% • 105% • 25% • 25%	 • 200% • 200% • 95% • 95%	Adm
Communications: • Open-ended loop • Preferred Port • Network Delay • Health Check	 • None • A • 15 seconds • 45 seconds	 • N/A • N/A • 10 seconds • 40 seconds	 • N/A • N/A • 45 seconds • 60 seconds	DST
Device ID	Name/Location	N/A	N/A	Adm
Faults Latched	Latched	N/A	N/A	Adm
Filter Service Interval	731 days (2 years)	1 day (Dependent up on environment)	3655 days (10 years)	Adm

Note: To meet UL specifications, any alarm threshold that initiates an evacuation procedure via a Fire Alarm Control Panel must not be set higher than 2% obs/m (0.625% obs/ft.)

3.4 Relay settings and conditions to change states

Table 3-3: Default relay settings and conditions to change state

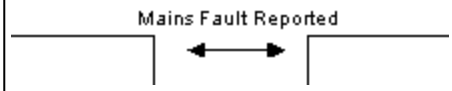
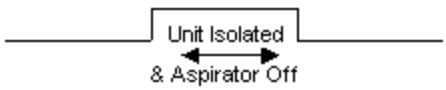
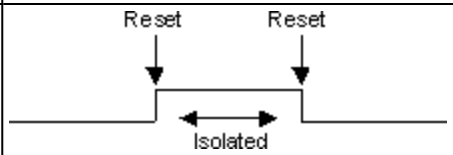
Relay #	Relay	Condition for relay to change state
1	Fault	This relay is de-energized when one of the following conditions occur: • Fault found on detector or on VESDAnet loop • Air flow normalization is initiated • System isolation is initiated When the Overlay Alert function has been selected, this relay is de-energized once the Alert threshold is initiated
2	Pre-Alarm	This relay is energized once the Pre-Alarm threshold is initiated
3	Fire	This relay is energized once the Fire alarm threshold is initiated

3.5 Auxiliary / GPI Terminals

The Bias, Reset (GPI) and LED terminals are located on the termination card (refer to Figure 6-1 on page 19 and Figure 6-2 on page 19). These terminals have the following functions:

- **Bias Terminals:** These output terminals provide a 10 VDC supply to initiate the reset input terminals via a remote reset/isolate switch.
- **LED Terminals:** These output terminals provide a 5 V, 15 mA DC supply via a 220 ohm resistor to power a remote LED.
- **Reset (GPI) Terminals:** These terminals are also known as the General Purpose Input (GPI) and are used for Reset, Mains OK or Standby functions. The input terminals require a voltage supply between 5 V and 24 VDC to operate. The voltage input to these terminals is isolated from the system by an opto-coupler device. Connect the Reset (+) terminal to the positive output and the Reset (-) terminal to the ground output of the external device.

Table 3-4: GPI functions

Function	State Change	
Mains OK	The detector monitors the state of the external power supply and responds to the following conditions. Mains OK ≥ 5 VDC is at this terminal Mains Fail ≤ 2 VDC is at this terminal	
Standby Mode	The detector Isolates and the aspirator turns OFF when ≥ 5 VDC is at this terminal. No Alarms can be generated in this state	
Reset Isolate	While power is applied to the GPI the detector is isolated. In addition, the connection of power to the GPI resets the unit. ≥ 5 VDC Detector Isolates ≤ 2 VDC Detector Reset	

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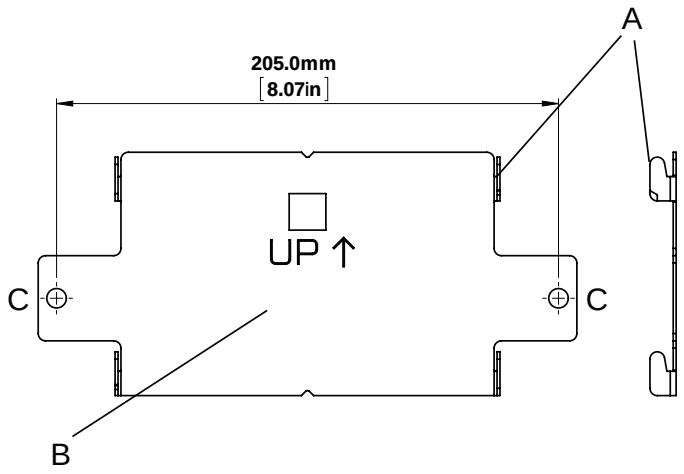
4 Mounting the Detector

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

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

4.1 Securing the mounting bracket

The mounting bracket for the VESDA VLC is always mounted in the UP direction. The mounting bracket is clearly marked with the word “UP” and an upward pointing arrow.



Legend	
A	Tab
B	This side to detector
C	Holes, 5/16 in (8mm) diameter

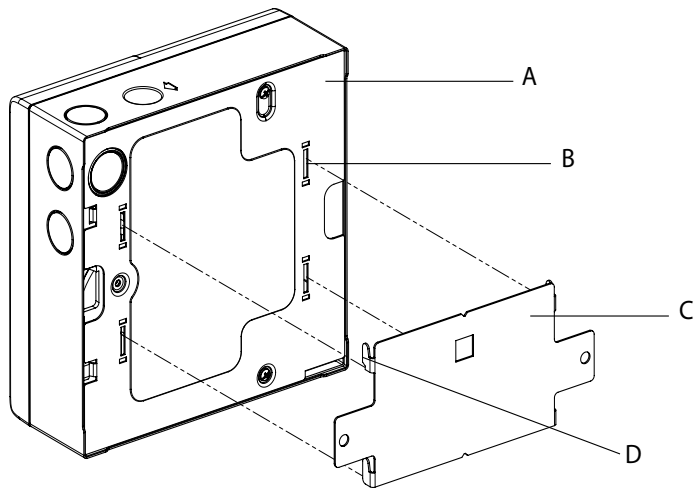
Figure 4-1: The mounting bracket for normal and inverted orientations

Secure the mounting bracket to the surface using appropriate fasteners, ensuring that the bracket is horizontally straight and sits flush on the surface.

Determine the ports for cable entry. Press out the tabs for the cable entry, air inlet and air exhaust ports.

4.2 Installing the Detector

Determine the orientation for mounting the VESDA VLC detector. Remove the front cover and if necessary separate it from the enclosure box. The back of the enclosure box is slotted over the four mounting bracket tabs. Slide the detector downwards until it slides onto the tabs. Screw in the anti-tamper screw. Check to confirm that the detector does not slide off the mounting bracket.



Legend	
A	Back of detector
B	Rectangle Slots
C	Mounting Bracket
D	Bracket Tab

Figure 4-2: Mounting the VESDA VLC detector onto the mounting bracket

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5 Connecting the VESDA VLC to the Sampling Pipe Network

5.1 Inlet Pipes

The air inlet port is designed to fit a standard pipe of 25 mm (1 in) OD. The pipe reducer show in Figure 5-1 is a 25 mm to 1.050 inches adaptor and is included for all USA shipments to fit the Pipe Inlet.

Figure 5-1: Pipe reducer

The air inlet port allows the pipe to be inserted up to 15 mm (0.60 in). To connect the detector to the pipe network:

1. Ensure a minimum length of 500 mm (20 in) of straight pipe before terminating the pipe at the air inlet port of the detector.
2. Square off and de-burr the end of the sampling air pipe, ensuring the pipe is free from debris.
3. Insert the pipe into the inlet port ensuring a firm fit. DO NOT glue the inlet pipes to the pipe inlet manifold.

5.2 Air Exhaust Pipe

Unplug the air exhaust port at the bottom of the detector. If necessary pipe the exhaust back to the relevant VESDA Zone. The maximum suggested length for the exhaust pipe is 4 m (13 ft.).

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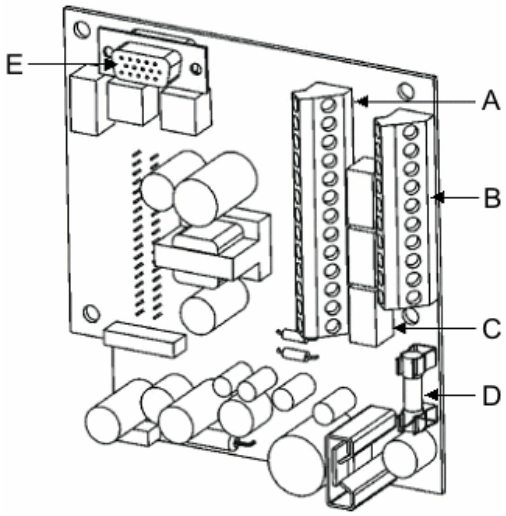
6 Wiring Connections

6.1 Termination Card

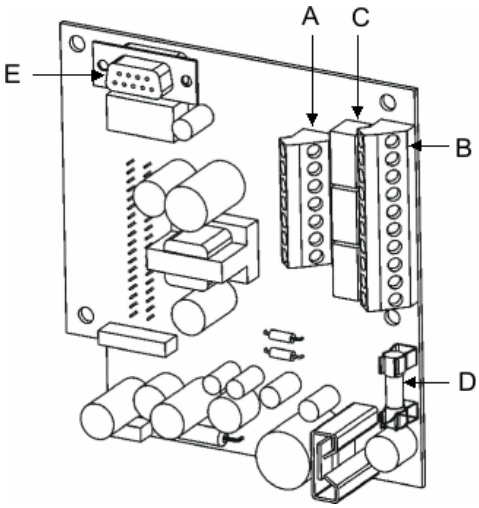
The Termination Card acts as the interface for VESDAnet (VN Model), VESDA Link (RO Model), power supply terminals, relay and relay terminals.



Terminal A		Terminal B	
1	Bias (-) (GND)	1	Shield
2	Reset (-) (GPI)	2	VESDAnet A (-)
3	Reset (+) (GPI)	3	VESDAnet A (+)
4	Bias (+)	4	Shield
5	LED (-) (GND)	5	VESDAnet B (-)
6	LED (+)	6	VESDAnet B (+)
7	FIRE (NO)	7	Power (-)
8	Fire (C)	8	Power (+)
9	Pre-Alarm (NO)	9	Power (-)
10	Pre-Alarm (C)	10	Power (+)
11	Fault (NO)	NC = Normally Close	
12	Fault (C)	NO = Normally Open	
13	Fault (NC)	C = Common	

Legend			
A	Terminal A	**D**	1.6 Amp Fuse
B	Terminal B	**E**	VESDAnet Socket
C	Relays		

Figure 6-1: VESDA VLC termination card VN Model (VLC-505)



Terminal A		Terminal B	
1	FIRE (NO)	1	Bias (-) (GND)
2	Fire (C)	2	Reset (-) (GPI)
3	PRE-ALARM (NO)	3	Reset (+) (GPI)
4	PRE-ALARM (C)	4	Bias (+)
5	FAULT (NO)	5	LED (-) (GND)
6	FAULT (C)	6	LED (+)
7	FAULT (NC)	7	Power (-)
NC = Normally Close		8	Power (+)
NO = Normally Open		9	Power (-)
C = Common		10	Power (+)

Legend			
A	Terminal A	**D**	1.6 Amp Fuse
B	Terminal B	**E**	VESDAlink Socket
C	Relays		

Figure 6-2: VESDA VLC termination card RO Model (VLC-500)

6.1.1 VESDAnet Terminals (VN Model only)

The VESDA VLC detector can be connected to VESDAnet through the VESDAnet terminals on the Termination Card. The terminals enable VESDAnet communication cables to be brought into the detector and then looped out to another device. Data communication between the detector and other devices on VESDAnet are bidirectional. The polarity of the data wires must be maintained throughout the network. It is recommended that RS-485 (BELDEN 9841 - 120 Ohm) twisted pair cables (or similar) be used. The VESDA VLC is shipped without the VESDAnet A and B channels looped. If the detector is not to be networked with other devices, then loop the A and B channels, as shown in Figure 6-3.

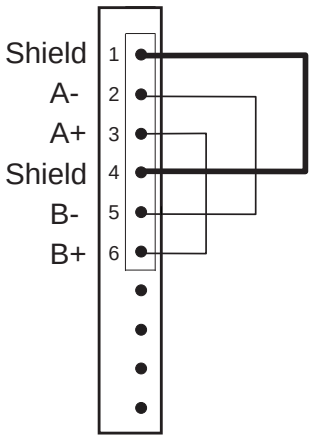


Figure 6-3: Stand-alone VESDAnet connection for VESDA VLC

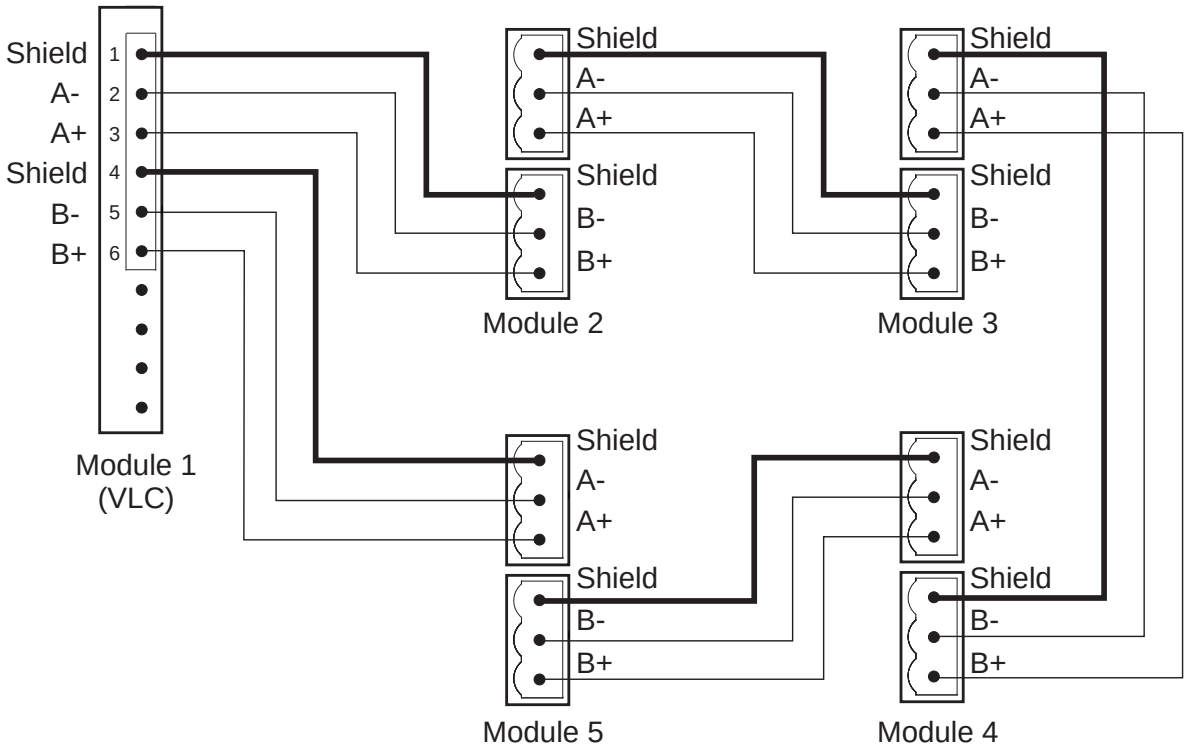


Figure 6-4: An example of the wire connection for VESDAnet (closed loop)

6.1.2 Relay terminals

There are three relays designated Fault, Pre-Alarm and Fire. The relays can be used to connect to a Fire Alarm Control Panel (FACP) or to activate external devices. The default relay states are non-energized except for the fault relay, which is set to the energized state on power up.

6.1.3 Programming socket

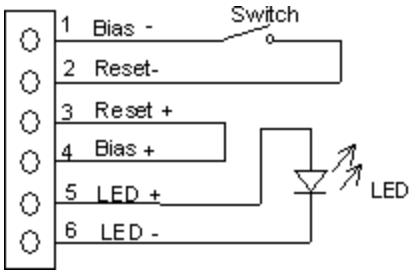
The 15 pin or 9 pin programming socket on each termination card provides the communication interface between the detector and a LCD Programmer or PC. Use the information listed below to determine the type of programming device required to program a VN or RO detector.

- **VN model (VLC-505):**
  - The programming socket on the termination card has 15 pins. Use a LCD Programmer and connect the programmer cable to the 15 pin VESDAnet programming socket.

    OR

  - Use a PC with a VESDA PC-Link HLI and the appropriate data cables to connect to the 15 pin VESDAnet programming socket.
- **RO model (VLC-500):**
  - The programming socket on the termination card has 9 pins. The RO model is programmed using PC software only. Connect the PC to the detector using an RS-232 data cable directly to the 9 pin VESDAlink programming socket.

6.1.4 Auxiliary / GPI Terminals



Switch	
Closed	Isolate
Open	Reset

Figure 6-5: Wire connection for Auxiliary / GPI Terminals

For further information refer to Section 3.5 on page 13.

6.1.5 Typical Wiring to a 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.

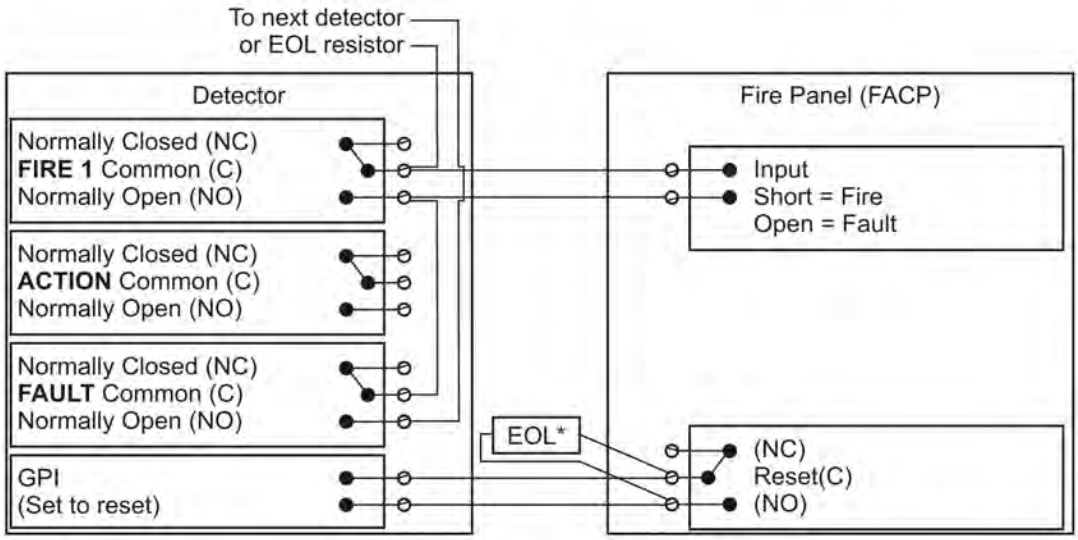


Figure 6-6: Typical wiring to a Fire Alarm Control Panel (FACP) with EOL

6.1.6 Wiring to an Addressable Loop Module

This wiring example is for wiring VESDA detectors to a typical 3 input 1 output Addressable Loop module. These are example drawings. Refer to the appropriate product manual for the exact wiring details of the third party equipment.

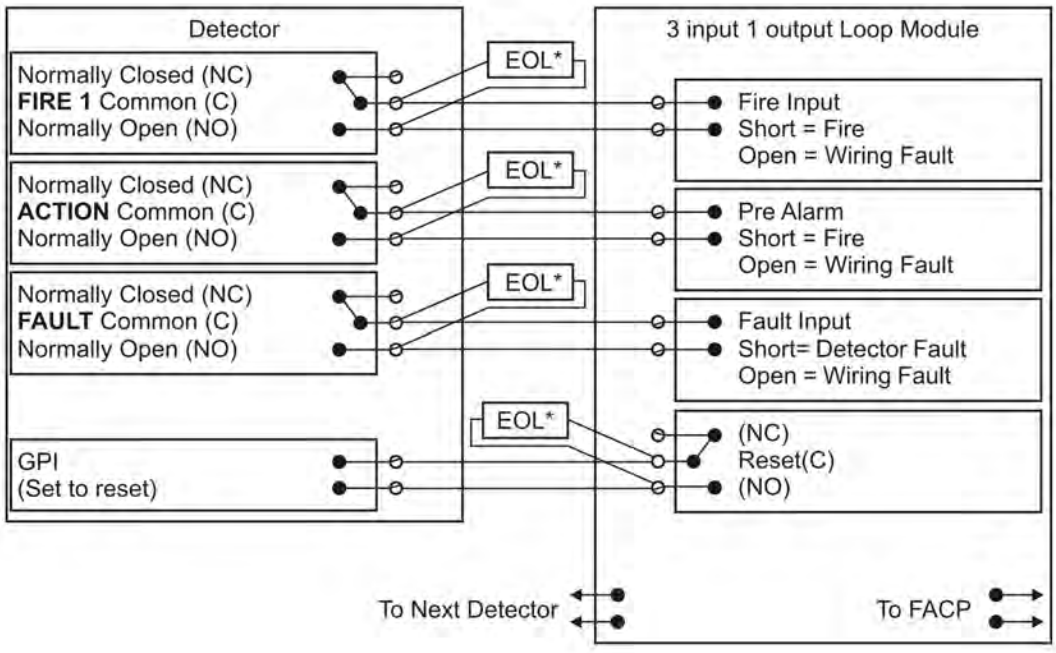


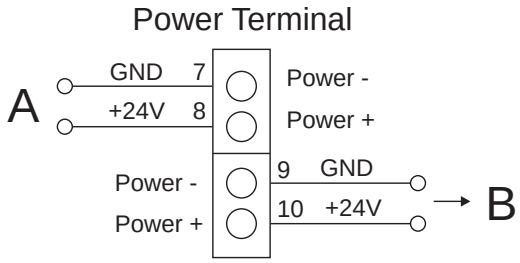
Figure 6-7: Addressable Loop Module with EOL

7 Power Source

The power terminals on the termination card connect to a 24 VDC power supply. The four power terminals enable power to be brought into the detector and looped out to another device. The detector has reverse polarity protection to minimize the risk of damaging the detector.

Notes:

- The VESDA VLC detector will not operate when the power supply is reversed.
- Operating the detector outside the DC supply voltage range of 18 VDC and 30 VDC may cause damage to the device..



Legend	
A	From 24V Power Supply
B	24V Power to Next Device

Figure 7-1: Wire connection details for the power terminals on the VN and RO model termination card

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8 Battery Backup

The power supply for the VESDA VLC detector may be switched to a back up battery in the event of the supply being disrupted. The size of the battery back up is determined by local standards and codes, the total power required by the system, back up time required, allowance for reduction in capacity with age and expected temperature variations.

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

8.1 Backup battery size calculation sheet

Table 8-1: Calculating the size of backup battery

	Normal Load @ 24 VDC			Full alarm load @ 24 VDC		
Equipment	**Load mA**	**Number**	**Total**	**Load mA**	**Number**	**Total**
Detector	225			245		
Remote Display	90			110		
Remote Programmer	50 (backlight off)			110 (backlight on)		
Hand-held Programmer	50 (backlight off)			110 (backlight on)		
Other 24 V loads						
	Total mA			Total mA		
			X			X
	Standby hours			Alarm hours		
			=			
	Standby capacity			Alarm capacity		
		Total capacity = Standby + Alarm capacity				
		Divided by 1000 for standby capacity				
		Multiplied by battery factor (Normally 1.25)				

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9 Starting Up

Note: The VESDA VLC detector must be powered up by VESDA accredited personnel only.

After installing the VESDA VLC detector it is necessary to power up the system. The system takes approximately 15 seconds to power up. If the system fails to power up, check all power wires are secured to the terminals and the polarities of the power wires are correct.

On power up:

- The aspirator starts up
- The LED indicators on the VESDA VLC front cover:
  - Will light up and cycle on and off
  - If a fault has been detected the Fault LED indicator will remain lit
  - If the system is functioning normally the OK LED indicator will remain lit
- If a Remote Display Module is connected the following indicators are lit:
  - Fire alarm threshold indicators
  - Smoke threshold levels on bar graph
  - Two digit numerical display
  - Various fault indicators if there are any faults
  - System OK indicator if there are no faults

If any of the above does not happen, contact your commissioning engineer or distributor to troubleshoot the problem.

Note: It is normal for the detector to display faults immediately after power up. Reset the detector by pressing the reset button on the front cover of the detector to unlatch the relays and fault LEDs. The fault LEDs on the front cover will illuminate. Proceed with the preliminary systems check.

9.1 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? Note that the two mounting bracket securing-screws are provided in a separate bag with the detector.		
Is the sampling air pipe firmly connected to the air inlet port? Ensure the pipe is 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 signaling wires been terminated to the correct terminals on the detector?		
Is the exhaust pipe firmly fitted to the exhaust port? Ensure the pipe is NOT glued.		
Has the front cover been replaced correctly?		
Has AutoLearn Smoke been performed? Please state the AutoLearn Smoke period_____		
Is the air sampling pipework installed and checked as per the site plans?		

10 Preliminary Systems Check

A preliminary systems check is required after installing the VESDA VLC detector, before it is commissioned for use. The check can be conducted by connecting the detector to a LCD Programmer or by using the Xtralis VSC software. The preliminary systems check includes:

- Conducting a VESDAnet communications check
- Accepting factory default configurations, or changing to site requirements
- Normalizing the air flow
- Conducting a basic pass/fail smoke test

For details on the preliminary systems check refer to the LCD Programmer or the relevant software manuals. Refer to the VESDA LCD Programmer and Commissioning Guides for further details.

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11 Maintaining and Servicing the Detector

To maintain the VESDA VLC detector at its peak performance the maintenance schedule given below should be followed. Maintenance can be conducted by the original installer, a VESDA distributor, or an authorized service contractor. To work effectively the VESDA VLC detector needs to be supported by a well designed pipe network. The VESDA Maintenance Guide contains a schedule for pipe network maintenance. More frequent maintenance may be necessary for harsh environments or be required by the local fire authority.

Table 11-1: Maintenance schedule for VESDA VLC detector

Maintenance Check	Quarterly	Six Monthly	Annually	Biennial
Power Supply	X			
Visually Inspect Pipe Network		X		
Filter Inspection			X	
Pipe Integrity Smoke Test			X	
Check Pipe Flow			X	
Clean Sampling Point				X
Flush Pipe Network				X

Caution: When a VESDA VLC detector has been isolated, no fire warnings will be issued by the VESDA VLC and any fire will go undetected. Prior to any maintenance or testing:

- Inform appropriate supervising authority about the risk associated with isolating a VESDA detector.
- Ensure that any ancillary devices dependent on the VESDA VLC is/are isolated before work is begun.

Attention : Lorsqu'un détecteur VESDA VLC a été mis hors tension (isolé), aucun avertissement de feu ne sera émis par le détecteur VESDA VLC et aucun incendie ne pourra être détecté. Avant tout entretien ou essai :

- Informez l'autorité compétente du risque associé à l'isolement d'une adresse VESDA (anciennement appelée zone VESDA).
- l Vérifiez que tous les appareils auxiliaires dépendants du VESDA VLC sont isolés (mis hors tension) avant de commencer à travailler.

11.1 Opening and Closing the Detector

11.1.1 Opening the detector

1. Undo the four screws on the front cover.
2. Open the front cover and allow cover to hang by the attached plastic strap

11.1.2 Closing the Detector

1. Replace the front cover over detector enclosure ensuring the plastic strap and cable loom are not wedged between the cover and enclosure
2. Tighten the two screws.

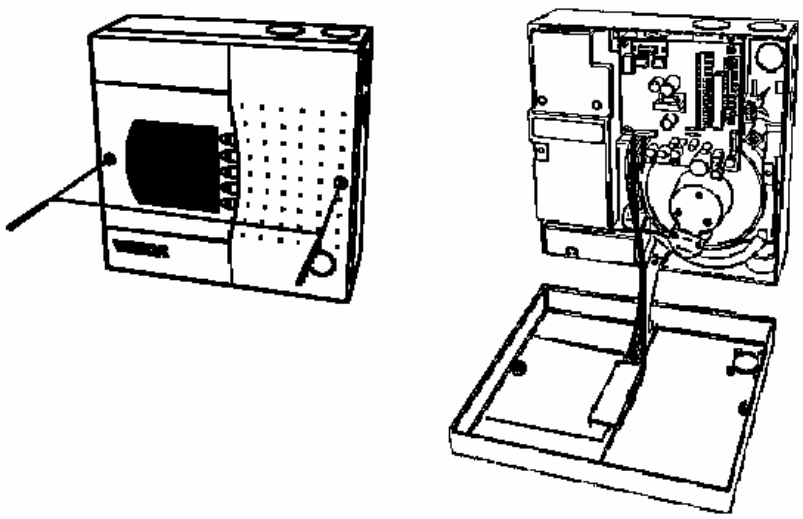
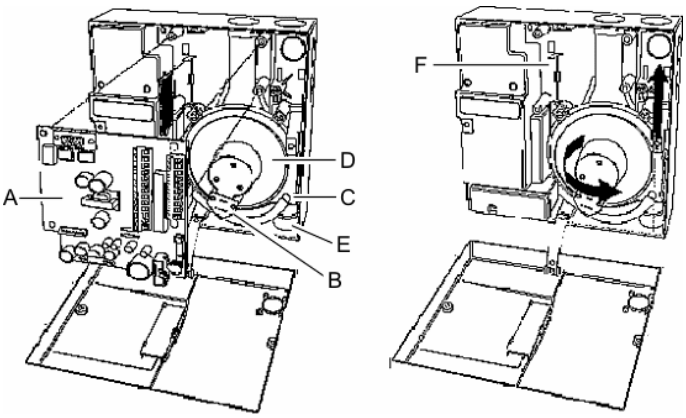


Figure 11-1: Opening and closing a VESDA VLC detector

11.2 Replacing the Aspirator

1. Remove the 4 screws securing the termination card (A)
2. Disconnect the wires on the aspirator (B)
3. Gently pull out termination card (A) from the interface card (the interface card is not visible, it is connected to the back of the termination card). Leave the termination card suspended by its wires.
4. Pull off the air hose from aspirator pipe (C)
5. Undo the (captive) screws securing aspirator (D)
6. Lift the aspirator out



Legend	
A	Terminal Card
B	Aspirator Wire Loom
C	Aspirator Air Hose
D	Aspirator
E	Pipe Network Port
F	Interface Card Slot

Figure 11-2: Illustration for replacing the aspirator

11.2.1 Assembly

1. Put the aspirator pipe inlet into the hole leading to the pipe network (E).
2. Tighten the screws securing the aspirator (D).
3. Connect the air hose to the aspirator pipe (C). Ensure a tight fit over the pipe.
4. Insert the termination card (A) into the interface card slot (F).
5. Tighten the termination card screws (A).
6. Reconnect the wires to the aspirator (B).
7. Put the front cover back on and tighten the screws.
8. Power ON the detector and check the aspirator is running.
9. Resolve all Fault conditions.

11.3 Internal Wiring

The table below provides the cable loom interconnecting details inside the detector.

Table 11-2: Interconnecting loom details

From	To	Connector Name on CPU	Cable Name	# Pins
CPU card	Detection chamber	Pre-amp or X9	Pre Amp	6 Wire ribbon
CPU card	Detection chamber	Laser or X10	Laser	6
Termination card	LED PCB	LED card or X11	LED cable	7
Termination card	Aspirator	Aspirator or X12	Aspirator cable	3

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12 Spare Parts

On larger sites having multiple detectors it is advisable to stock certain critical spare parts. A list of spare parts with quantities required is given below:

Table 12-1: Recommended spare parts stock

Part No.	Description	Number of detectors Installed to warrant ONE Spare Part	
		Normal Service	Mission Critical
VSP-005	Filter Cartridge	50	20
VSP-501	Aspirator	n/a	20
VSP-502	VLC VN Remote Display Module	50	20
VSP-510	VLC RO Termination Card (CTC-RO)	50	20
VSP-515	VLC VN Termination Card (CTC-VN)	50	20

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