

Vision Fire & Security

VESDA[®]

**LaserFOCUS
VLF-250
Product Guide**

March 29, 2005

Part: 20295



Vision Systems

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Should product under warranty not be in good working order, VFS will, at its option, either repair or replace the product or its component parts at no additional charge.

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This warranty does not cover the repair or damage to the product resulting from or arising out of (i) negligence or improper use storage, installation, configuration, commission, service, maintenance or handling of the product (where 'improper' includes treatment other than in accordance with any manual or instructions for use of the product); (ii) accident, unforeseeable circumstances or disaster; (iii) modifications to the product other than in accordance with VFS's instructions; (iv) attachment of features or interoperation with features, software or products not approved by VFS in writing; or (v) where the product has been serviced by persons not authorized by VFS in writing to service the product.

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
<i>Italics</i>	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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Standards

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 The information below was correct at time of printing but may now be out of date, check with your local codes, standards and listings for the current restrictions.

FDA

This VESDA 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

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).

Codes and Standards Information for Air Sampling Smoke Detection

ONORM F3014

ONORM F3014, transport times for all tubes (including capillaries) must not exceed 60 seconds from any hole. This means that the pre-designed 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.

AS1603.13

AS1603.13: VESDA detectors are not compliant with the pressure testing in this standard.

FM Approved Applications

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

European Installations

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

Listing Information for the VESDA LaserFOCUS

UL Listing

For open area protection the fire alarm threshold (signal) that initiates an evacuation procedure via the Fire Alarm Panel must not be set no less sensitive than 0.625%/ft. The detector can send this signal either via the Fire Alarm Panel Output signal or the Pre-alarm output signal.

ActivFire Listing

The fire alarm threshold (signal) that initiates an evacuation procedure via the Fire Alarm Panel must not be set no less sensitive than 1%.

Product Listings

UL
ULC
FM
LPCB
VdS approval number G205018
NF
ActivFire
CCCP
CE (EN 50130-4:1995 A2:2003 & EN 61000-6-3:2001)

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1.1 Scope

This manual describes the features of the VESDA LaserFOCUS, the specifications and functions, installation requirements, commissioning and operation procedures. A schedule for preventative maintenance is also provided.

1.2 Introduction to VESDA LaserFOCUS

The VESDA LaserFOCUS early warning air sampling smoke detector incorporates world leading VESDA very early warning laser based aspirated smoke detection technology. It provides localized fire risk management solutions for small, critical environments. The VESDA

LaserFOCUS VLF-250 monitors areas up to 250 m² (2500 sq. ft.), dependant on local codes and standards. The VESDA LaserFOCUS complements the existing VESDA detector range and has been designed to provide simple installation and commissioning, absolute smoke detection and reliable and consistent response to smoke events without being affected by false alarms.

General notification



Note: Prior to carrying out any work or maintenance on the VESDA LaserFOCUS take the necessary steps to advise the monitoring authority that power may be removed and the system disabled.

Caution: Electrostatic discharge precautions need to be taken prior to removing the front cover from the detector otherwise damage may occur to the unit.

1.3 Installation

The VESDA LaserFOCUS detector is shipped with all the components necessary for installation with the exception of pipe and associated materials.

Components include:

- 1 LaserFOCUS detector with fitted exhaust deflector.
- 1 Mounting bracket.
- 1 End of Line resistor (see *GPI – General Purpose Input (Terminals 1 & 2)* on page 7)
- 2 M4 x 20 mm locking screws
- this Product Manual

Check all components for damage and refer any concerns to your VESDA distributor.

Note: Removing the rear cover of the detector will void your warranty.

Note: Opening or removing the sealed laser detection chamber will void your warranty.

Detector mounting

The VESDA LaserFOCUS can be installed upright, inverted or horizontally.

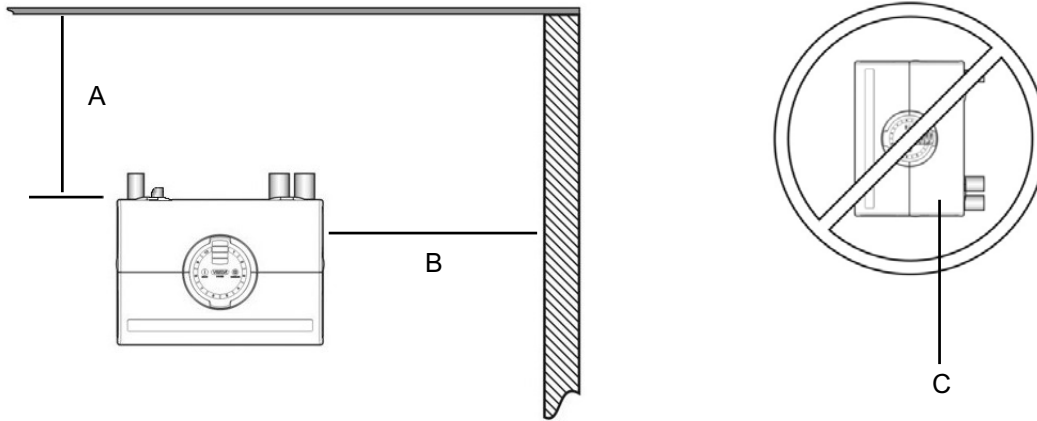
Note: Ensure the smoke detector is mounted away from obstructions and below ceiling level.



Caution: An exhaust deflector must be fitted for upright mounting, unless the exhaust port is connected to a return air pipe.

Caution: Do not install this unit on its side. There is a risk of particulate and condensation collecting on critical elements of the detector chamber reducing the detectors performance.

Ensure that there is sufficient clearance to mount the detector, noting the location of air sampling pipes and cable entry points. Owing 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. 500 mm (20 in.) from a wall or obstruction to allow access to the security tab
C	Do not install the detector on its side

Figure 1 - Mounting location

Installing the smoke detector

In all installation cases the mounting bracket must be fitted (upright) as shown in figure 2, "Mounting bracket orientation for upright and inverted mounting," on page 3.

Note: Ensure the mounting surface is flat. This will permit an air tight seal to be achieved between the sampling pipe and the tapered air ports on the detector.



Warning: Prior to drilling the attachment holes for the mounting bracket, ensure that all mounting surfaces (i.e. walls, cabinet sides, etc). are clear of electrical wiring and plumbing.

Where the pipe network and cabling are already fitted, the bracket can be used to aid alignment of the detector with the pipes. The Installation procedure below explains this process.

Installation procedure

Cut the air inlet pipe and exhaust pipe (if used) at 90°, and to the same length (for normal and inverted mounting). Remove all rough edges. This is critical to obtain an air tight seal with the smoke detector.

1. Position the air inlet centerline mark (A), see Figure 2, of the mounting bracket against the end of the air inlet pipe.
2. In the cut out section of the mounting bracket mark a line across the top of the cut out if metric size pipe is used or mark a line across the bottom of the cut out if Imperial size pipe is used.
3. Slide the mounting bracket down (up for inverted mounting) until the top of the bracket aligns with the marked line.
4. Mark off and drill the 2 bracket mounting holes (H).
5. Screw the bracket to the wall.
6. Hook the smoke detector onto the mounting bracket tabs and pull it down into place.
7. Use the two M4 x 20 mm locking screws provided and screw them into the screw holes on the left and right side of the detector. See the items marked (F) in the Figure *Detector removal* on page 5.
8. The air sampling pipe can now be attached and power connected.
(See section *Wiring connections* on page 19 for connection information).

For inverted installation, to mark off the location of the mounting holes, follow steps 1 – 4 with the mounting bracket inverted to that shown in figure 2, “*Mounting bracket orientation for upright and inverted mounting,*” on page 3. Also see *Inverting the user interface display* on page 4.

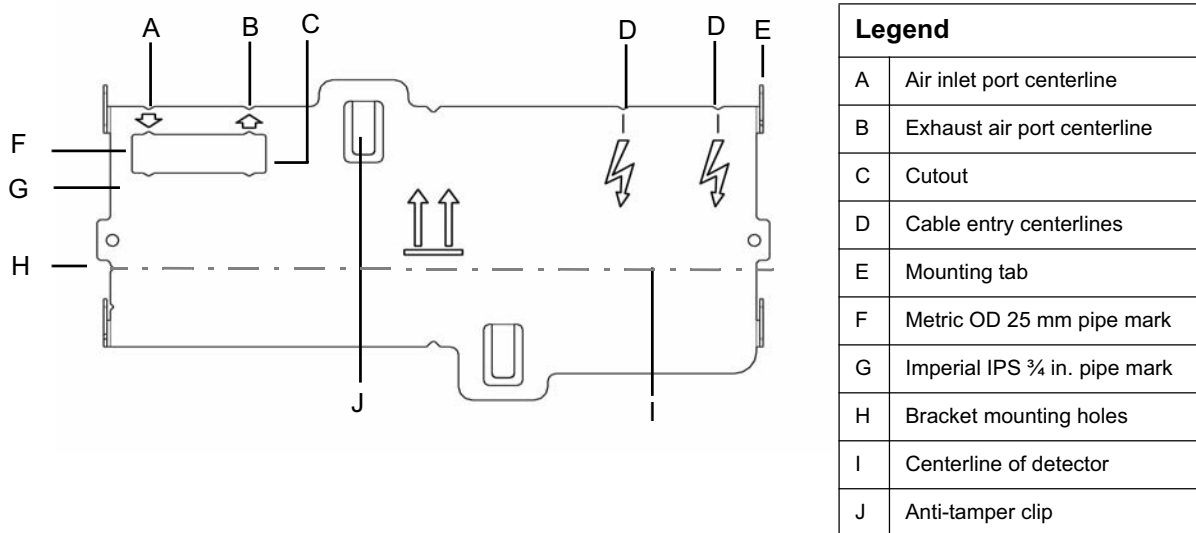


Figure 2 - Mounting bracket orientation for upright and inverted mounting

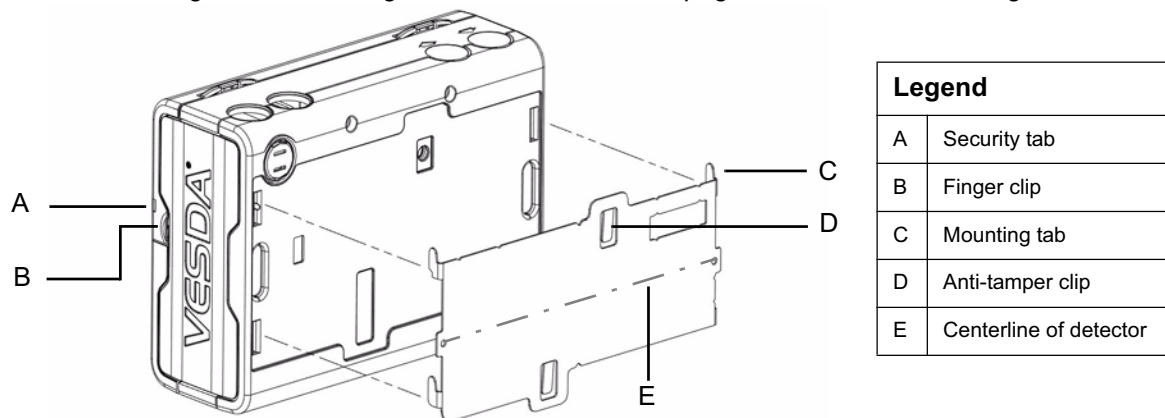


Figure 3 - Mounting bracket rear view

Inverting the user interface display



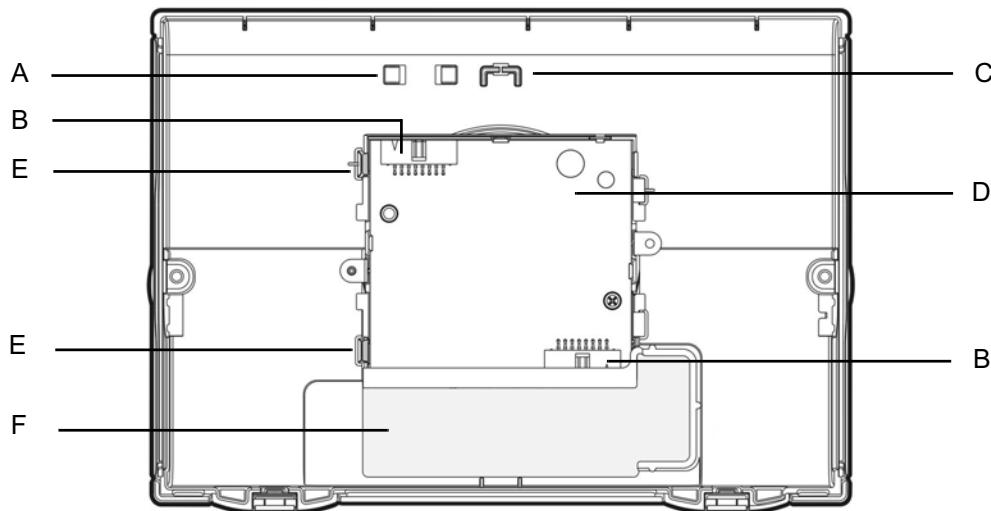
Caution: Electrostatic discharge precautions need to be taken prior to removing the front cover from the detector.

For inverted mounting applications, the VESDA LaserFOCUS will require the user interface display to be turned through 180°. This is carried out prior to installing the detector. Also see *Mounting bracket orientation for upright and inverted mounting* on page 3.

Inverting the user interface display:

1. Place the detector on its back, push in the securing tab and lift up the field service access door. (See Figure 23, “Field Service Access Door security tab and clip,” on page 25).
2. Remove the 2 retaining screws and lift off the main cover.
3. Disconnect the restraining strap from the clip (C) and the ribbon cable from the user interface card (B) and place the cover aside.
4. Open the clips (E).
5. Lift out the user interface display card, carefully turn it through 180° and then clip it back into place.
6. Reconnect the ribbon cable and the restraining strap.
7. Replace the main cover and screw down the 2 retaining screws.
8. Close the field service access door.

The detector is now ready for inverted installation.



Legend			
A	Ribbon cable clip	D	Interface card
B	Ribbon cable connector	E	Clip
C	Retaining strap clip	F	Air filter cartridge cavity

Figure 4 - Inside view of the front cover (as it would appear inverted)

Detector removal



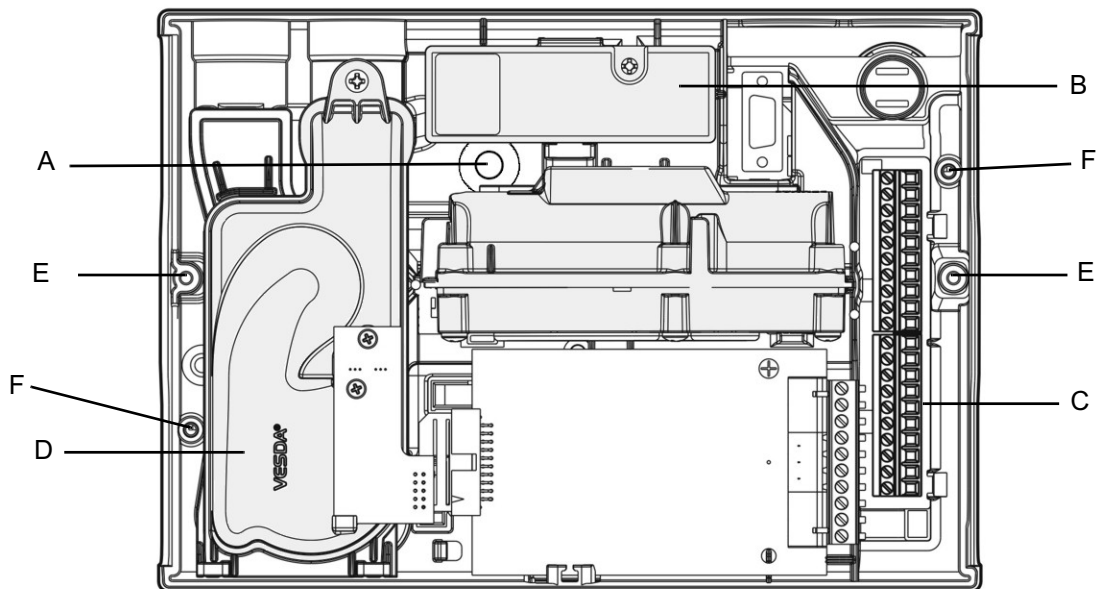
Caution: Electrostatic discharge precautions need to be taken prior to removing the front cover from the detector otherwise damage may occur to the unit.

Note: Take the necessary steps to advise the monitoring authority of work being carried out and that the system needs to be disabled.

1. Turn off the power to the detector.
2. Disconnect the sampling pipes.
3. Push in the security tab and lift up the field service access door, see Figure 23, “*Field Service Access Door security tab and clip,*” on page 25.
4. Unscrew the front cover retaining screws (E).
5. Lift off and swing down the front cover, a restraining strap will take the load. For inverted mounted detectors the cover should be removed and placed aside.
6. Disconnect all field wiring from the terminal block.
7. Unscrew the two M4 x 20 mm locking screws on the left and right side of the detector. See the items marked (F) in the Figure *Detector removal* on page 5
8. Use a screw driver to push down the anti-tamper clip in hole (A), at the same time, push the detector base up.
9. Lift the detector off the mounting bracket.

Once the detector has been removed re-fit the front cover to keep the internal components safe from damage and the electrical cabling safe.

Note: For inverted mounted detectors, the front cover will need to be removed prior to unhooking the detector from the mounting bracket. Disconnect the retaining strap and the ribbon cable from the user interface card and place the cover aside.



Legend			
A	Anti-tamper clip access hole	D	Aspirator
B	Dual stage air filter cartridge	E	Retaining screw
C	Terminal block	F	Bracket locking screw holes

Figure 5 - Detector removal

Air inlet pipe connections

The tapered shape of the air inlet port is designed to accept standard pipes of OD 25 mm (ID 21 mm) or IPS ¾ in (OD 1.05 in) and provide an air tight seal.

Note: Do not glue the air inlet pipe to the detector. This will void your warranty.

Exhaust air pipe connections

Where the VESDA LaserFOCUS is located outside the protected area, consideration must be given to returning the exhaust air to the protected environment to balance pressure differences that may exist between the two areas. In the majority of applications, this is not necessary as pressure differences are minimal.

Where pressure differences exceed 50 Pa, in situations where the detector is located outside the protected area, the pre-engineered solutions in this manual may not be suitable and it is recommended that alternate designs are verified by a suitably qualified installer using ASPIRE2.

Return air pipes need to be as short as possible to minimize the effect of airflow resistance in the return air pipe network. Remove the fitted exhaust deflector and install a return air pipe where required.

The air exhaust port is tapered to accept standard pipes of OD 25 mm (ID 21 mm) or IPS ¾ in. and provide an air tight seal.

Note: Do not glue the exhaust air pipe to the detector. This will void your warranty.

Wiring connections



Caution: Electrostatic discharge precautions need to be taken prior to removing the front cover from the detector otherwise damage may occur to the unit.

Detector cabling requirements

The screw type terminals located on the termination card within the VESDA LaserFOCUS will accept wire sizes from 0.2 mm² to 2.5 mm² (30 – 12 AWG). Refer to the VESDA System Design Manual for cabling details.

To reach the terminal block, open the field service access door, see *Controls and indicators* on page 25, and then unscrew the front cover retaining screws. Lift off and swing down the front cover. The terminal block is located on the right hand side of the detector.

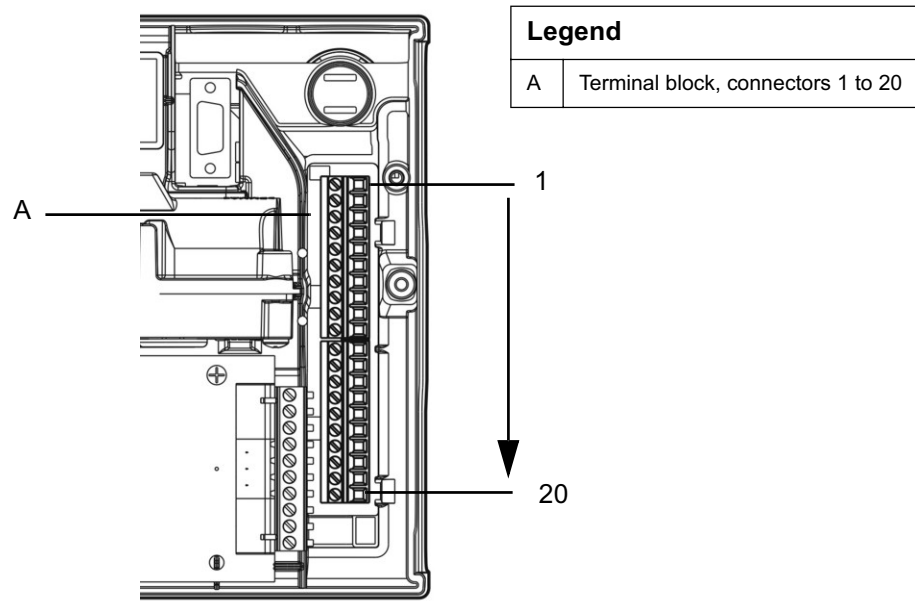


Figure 6 - Terminal block

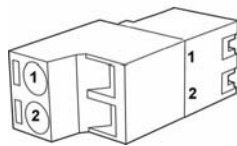
GPI – General Purpose Input (Terminals 1 & 2)

The General Purpose Input (GPI) is a programmable input. When the GPI function parameter is set to external, the detector shall indicate an external equipment fault condition by monitoring the line impedance. An 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 VLF to detect open or short circuits. The detector monitors the EOL resistor, see Figure 8, and reports any faults when the GPI function is set to any value, except **None**.



Caution: These terminal blocks come assembled and should NOT be disassembled.



Legend	
1	GPI pin 1
2	GPI pin 2

Figure 7 - Terminal and plug set up, GPI connections

The GPI function parameter can be set to the values shown in the table below to achieve several different functions:

GPI function parameter value	Result
None	GPI is disabled. If GPI will not be used we recommend that you leave the EOL resistor assembled.
Reset	Detector is reset on activation of the GPI (closing contact). Note: The factory-default value of the GPI function is Reset.
Disable	Detector is disabled while GPI is active (contact closed) and reset on de-activation of the input (contact open).
Standby	Detector is placed in standby (disabled, plus aspirator turned off) while GPI is active (contact closed) and reset on de-activation of the input (contact open).
Alarm set 1	Activation of GPI forces alarm threshold set 1 to be used. It overrides normal selection.
Alarm set 2	Activation of GPI forces alarm threshold set 2 to be used. It overrides normal selection.
External	Detector indicates a fault while the GPI is active (contact closed). Typically this is used to monitor external power supply units. Note: If the contact is closed it will raise an Instant Fault Finder No.6 fault. If wire is broken to the monitoring device it will raise an Instant Fault Finder No.8 fault.

Table 1 - GPI programming

The GP input detects a short circuit (e.g. the PSU fault relay) at or below 100 Ohms.

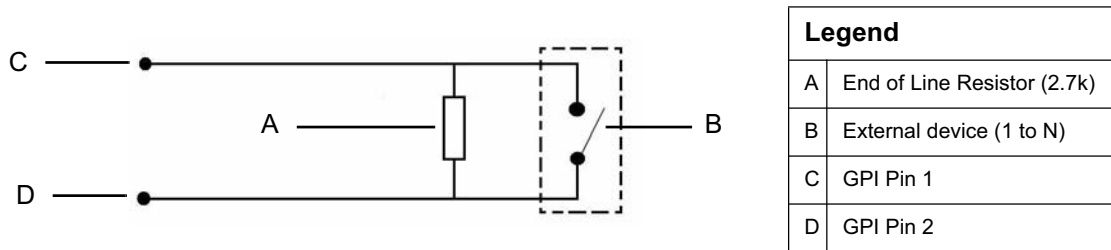
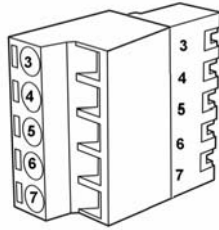


Figure 8 - Triggering of GPI

Extra terminals (Terminals 3, 4, 5, 6 & 7)

Terminals reserved for future use.



Legend	
3	Display Tx
4	Display Rx
5	Display Comm Gnd
6	Display Power -
7	Display Power +

Figure 9 - Terminal block display, spare power terminals

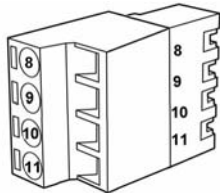
Power supply (Terminals 8, 9, 10 & 11)

Operating voltage:	24 VDC nominal (18 - 30 VDC)
Power consumption:	5.2 W nominal, 7.0 W in alarm
Current consumption:	220 mA nominal, 295 mA in alarm

It is recommended that the power supply be compliant with local codes and standards required by the regional authority. For code specific information see page ii.



Caution: Check the product termination wiring label during installation and subsequent maintenance visits.



Legend		
8	Power Return 0 VDC	From power supply unit
9	Power in 24 VDC	
10	Power Return 0 VDC	To next detector (if more than 1 detector per Power Supply Unit)
11	Power Out 24 VDC	

Figure 10 - Terminal block display, power supply

Relays (Terminals 12 - 20)

The relays allow alarm and fault signals to be hard wired to external devices, such as fire alarm control panels and loop interface modules away from the detector (example, sounding a siren at Action threshold). Refer to the appropriate installation manual for connectivity instructions.

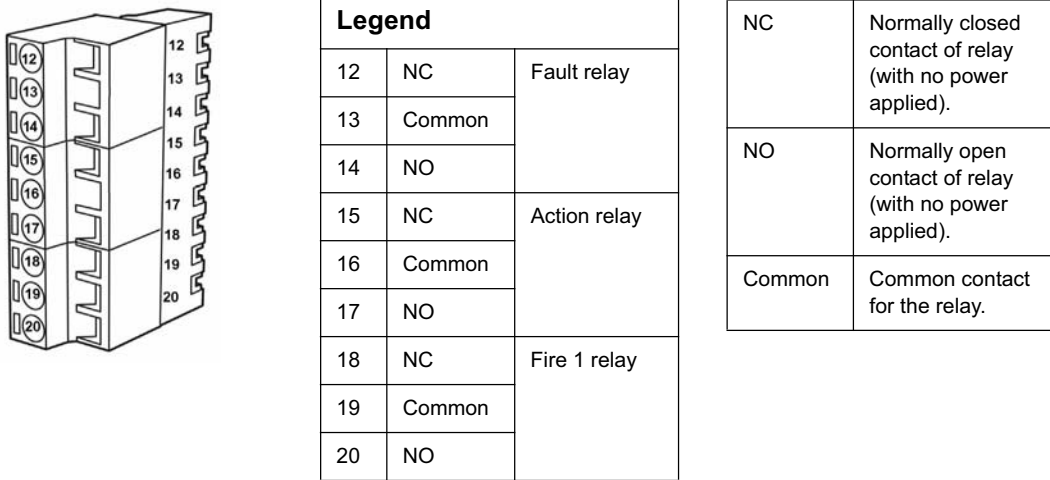


Figure 11 - Terminal block display, relays

NC	Normally closed contact of relay (with no power applied).
NO	Normally open contact of relay (with no power applied).
Common	Common contact for the relay.

Note: By default, the Fault relay is normally energized when no fault is present. For example when there is no fault present, terminal 12 is held open and terminal 14 is held closed. When there is a fault present, terminal 12 is held closed and terminal 14 is held open.

Typical Wiring To Fire Panel (FACP)

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

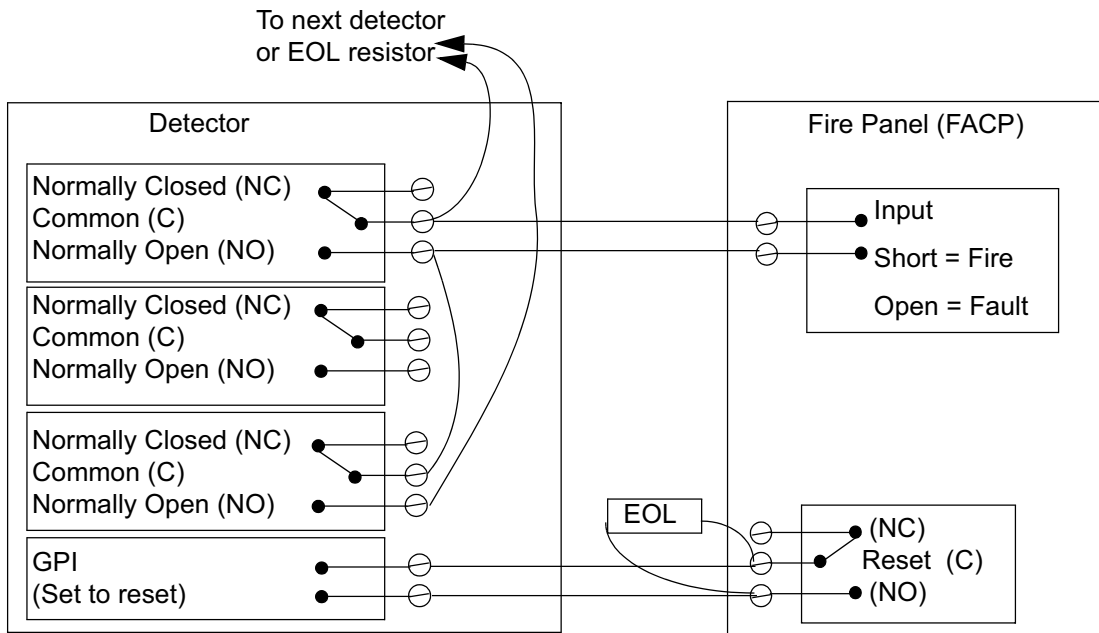


Figure 12 - Typical wiring to a fire panel with EOL

Wiring To an Address Loop Module.

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

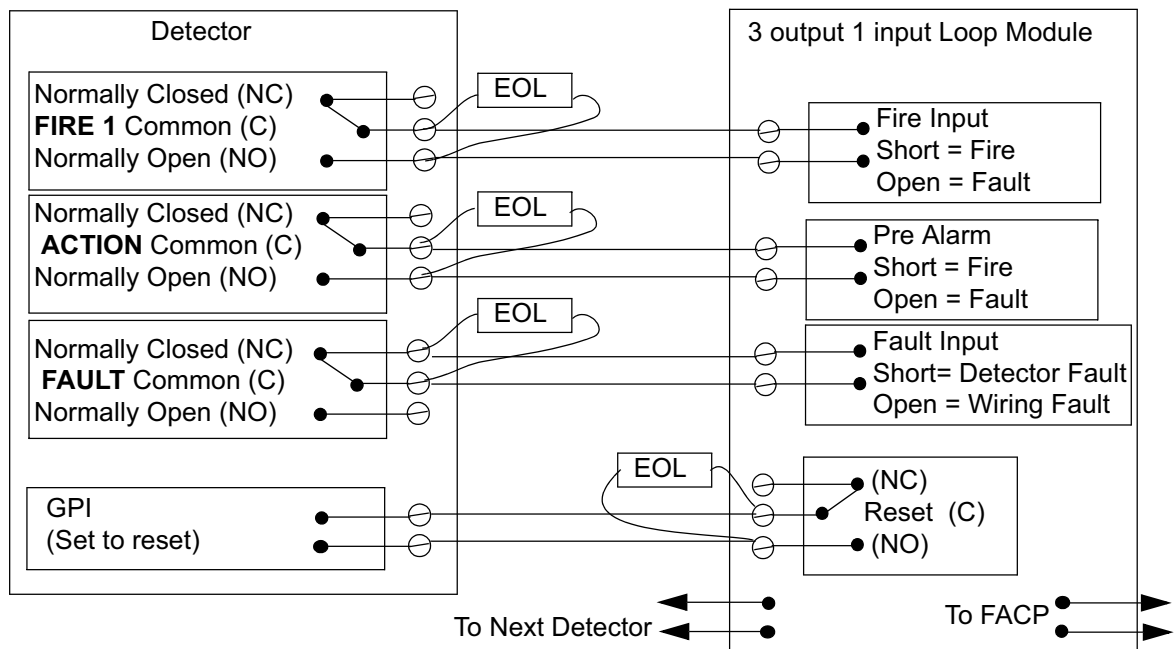


Figure 13 - Addressable Loop Module with EOL

Interface card

The VESDA LaserFOCUS allows for the installation of a variety of interface cards. Refer to the specific interface card installation sheet, product guide, or your local VESDA support person for further information regarding installation and configuration of this card.

RS232 Compatible serial port

The RS232 serial port requires a standard 9-pin DB9 PC COM serial extension cable (male to female) for configuring the detector using a PC with VESDA System Configurator (VSC) installed, for status monitoring and command input, and for event log extraction and software upgrades. For code specific information see page ii.

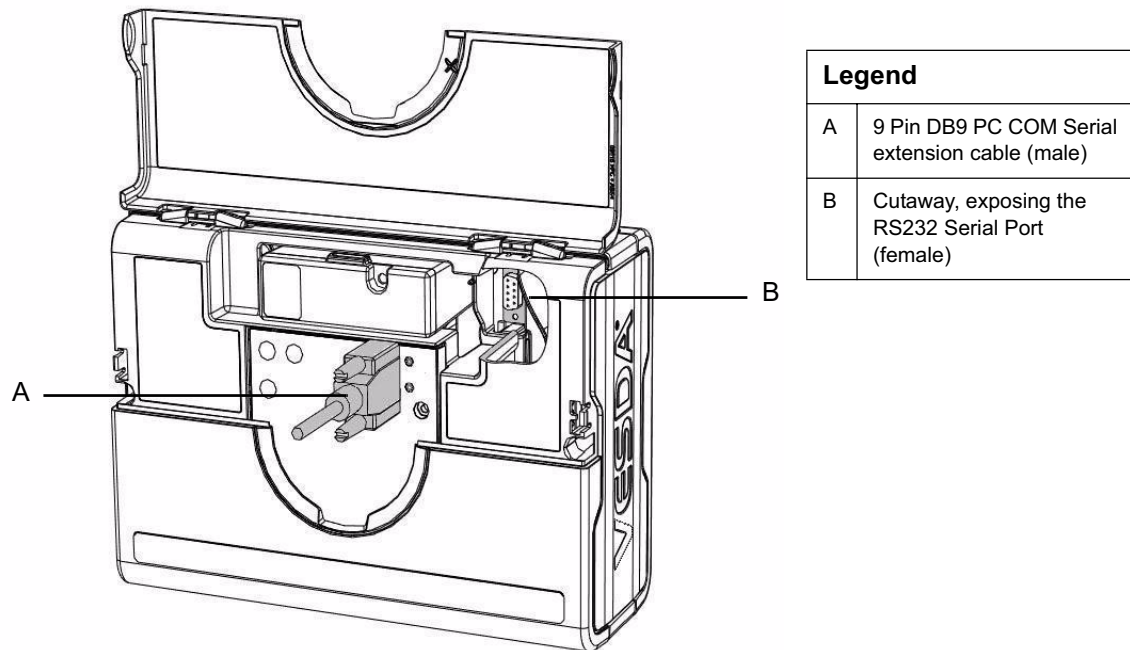


Figure 14 - 9 Pin connector and RS232 serial port

Installation Checklist

Site Name	
Address	
Detector Serial Number(s)	
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
1. Were the detector and the mounting bracket intact in the box?		
2. 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.		
3. Is the sampling air pipe firmly connected to the air inlet port? Ensure the pipe is <u>NOT</u> glued.		
4. Have the power wires been connected to the correct terminals on the detector?		
5. If required, has the end of line resistor been connected?		
6. Have the alarm signalling wires been terminated to the correct terminals of the detector?		
7. Have the VESDAnet wires been connected to the correct terminals on the VESDAnet Interface card (if applicable)?		
8. Has the plug at the exhaust port been removed and the exhaust pipe (if fitted) not glued?		
9. Has the front cover been replaced correctly?		
10. Has AutoLearn Flow and AutoLearn Smoke been performed? Please state the AutoLearn Smoke period _____		
11. Is the air sampling pipework installed and checked as per the site plans?		

Table 2 - Installation Checklist

1.4 Sampling Pipe Network Design

The VESDA LaserFOCUS supports a number of pre-engineered pipe network designs to simplify installation. The pre-engineered pipe networks have been designed with pressure, flow and transport time considerations. They have been verified and are shown below. For setup details refer to the VESDA System Design Manual.

The pre-engineered designs assume the following constraints:

1. There must be no mixing of open hole and capillary tubes in a pipe network design. All sampling points must be of the same type.
2. All sampling points must be evenly spaced in a pipe network design.
3. Branched designs must use the same number of sampling points along each branch.
4. Open hole designs must use the same size hole throughout the design.
5. Capillary tube designs must use the same size and length of capillary tube throughout the design.
6. The distance from the detector to the first sampling point must be 1 to 2 times the distance between sampling points. For example, if the sampling points are 4 meters apart, then the distance from the detector to the first sampling point must be between 4 and 8 meters.

Given the constraints detailed above, the pre-engineered pipe network designs will provide:

Parameter	Value
Transport times	less than 60 seconds for open holes less than 90 seconds for capillary tubes
Suction pressure	greater than or equal to 25 Pa across holes and capillary tubes
Detector pressure	greater than 70 Pa
Flow rate	12 - 24 L/min

For alternate or complex pipe network designs including end caps with sampling holes use the ASPIRE2 pipe modeling software to verify pipe performance. For code specific information see page ii.

Single pipe network

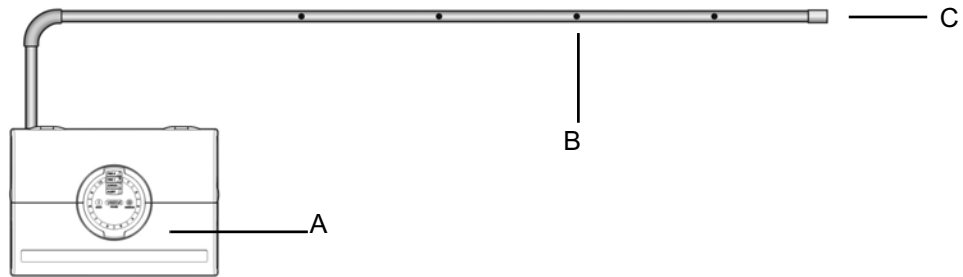
The table below shows the appropriate hole sizes for pre-engineered designs for a single pipe set up.

Single Pipe Network – max. length 25 m (80 ft.)				
Sampling holes	ID 21 mm Pipe		IPS ¾ in. Pipe	
	Open Hole	5.2 mm Capillary* with 5 mm hole	Open Hole	¾ in. Capillary* with ⅛ in. hole
	Hole Size (mm)	Length (m)	Hole Size (in.)	Length (ft.)
3	3.5 – 5.0	0 – 0.8	5/32 – 3/16	N/A
4	3.0 – 4.5	0.2 – 1.1	1/8 – 5/32	0 – 12
5	3.0 – 4.0	0.3 – 1.5	1/8 – 5/32	0 – 12
6	3.0 – 3.5	0.5 – 1.8	1/8	0 – 12
7-12	Use ASPIRE2 to calculate hole sizes in this range*			

Table 3 - Single pipe hole numbers and sizes

*For code specific information see page ii.

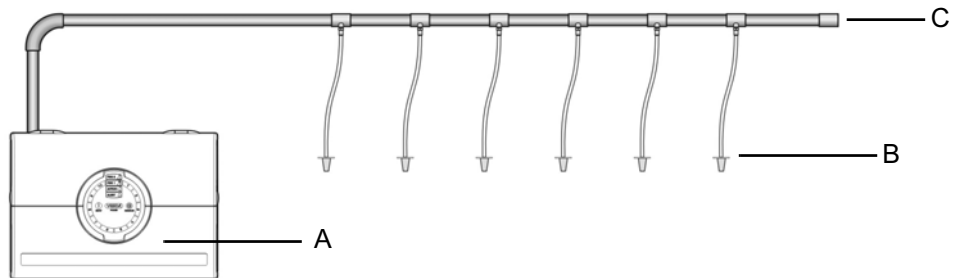
The set up below shows a single pipe arrangement with 4 sampling holes and a fitted end cap without a sampling hole.



Legend					
A	Smoke detector	B	Sampling hole	C	End cap (no hole)

Figure 15 - Open hole, single pipe

The set up below shows a single pipe arrangement with 6 capillary drop pipes and a fitted end cap without a sampling hole.



Legend					
A	Smoke detector	B	Capillary tube	C	End cap (no hole)

Figure 16 - Capillary tubes, single pipe

Branched pipe network

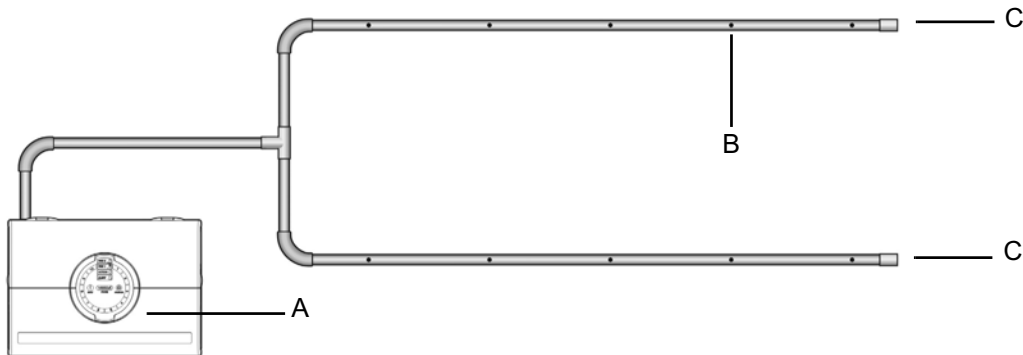
The table below shows the appropriate hole sizes for pre-engineered designs for a branched pipe set up.

Branched Pipe Network – (2 branches)		max. length 15 m (50 ft.) max. distance from detector to branch 5 m (15 ft.)		
Sampling Holes per Branch pipe	ID 21 mm Pipe		IPS ¾ in. Pipe	
	Open Hole	5.2 mm Capillary* with 5 mm hole	Open Hole	¾ in. Capillary* with ⅛ in. hole
	Hole Size (mm)	Length (m)	Hole Size (in.)	Length (ft.)
2	3.0 – 4.5	0.1 – 1.1	⅛ – 5/32	0 – 12
3	3.0 – 3.5	0.5 – 1.8	⅛	0 – 12
4	2.5* – 3.0	0.7 – 2.4	⅛	0 – 12
5-6	Use ASPIRE2 to calculate hole sizes in this range*			

Table 4 - Branched pipe hole numbers and sizes

*For code specific information see page ii.

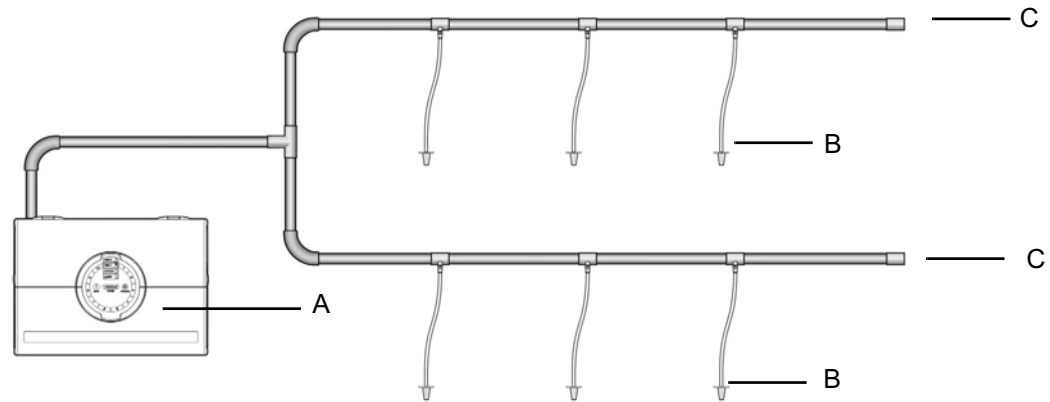
The set up below shows a branched pipe arrangement with 5 sampling holes per branch and fitted end caps without sampling holes.



Legend					
A	Smoke detector	B	Sampling hole	C	End cap (no hole)

Figure 17 - Open hole, branched pipe

The set up below shows a branched pipe arrangement with 3 capillary drop pipes per branch and fitted end caps without sampling holes.



Legend					
A	Smoke detector	B	Capillary tube	C	End cap (no hole)

Figure 18 - Capillary pipes, branched pipe

Return air sampling (return grilles)

The VESDA LaserFOCUS is suitable for air sampling across return air grilles of Air Handling Units. The recommended coverage of the VESDA LaserFOCUS is 0.4 m² (4 sq. ft.) per sampling hole. This should be considered in conjunction with local codes and standard.

Note: Rotate the air sampling hole approximately 45° away from the direction of the incoming airflow and towards the grille surface. This will minimize the risk of a Low Flow Fault being recorded in situations where air flow changes (e.g. where the Air Handling Unit is turned off).

Some points to consider for setting up a pipe network are:

- sampling holes should be evenly spaced (within 20% of the separation distance to each other)
- an un-vented end cap should be fitted to the end of the sampling pipe
- during installation, consideration should be given to the future maintenance requirements of the air handling unit. Access to filters should not be restricted and pipe network should be easily removable by the use of socket unions

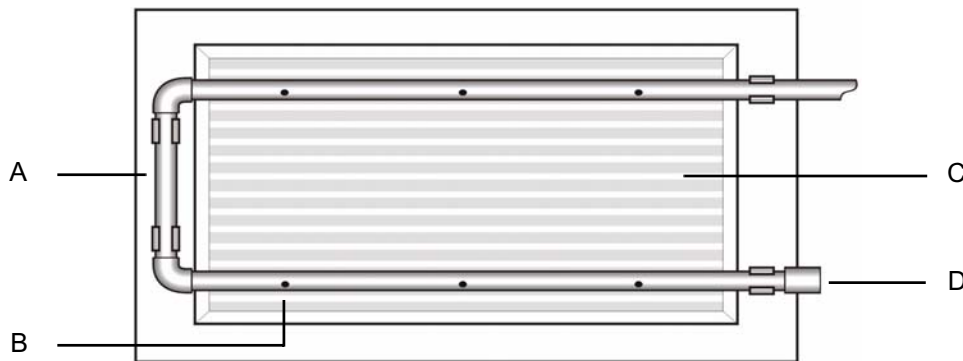
For full details concerning return air grille sampling pipe network design, consult the VESDA System Design Manual.

The table below shows the appropriate hole sizes for pre-engineered designs for return air grille set ups.

Return Air Sampling – U Shaped design with equal holes on each side		
Sampling Holes	ID 21 mm Pipe Hole Size (mm)	IPS ¾ in. Pipe Hole Size (in.)
4	3.0 – 4.0	1/8 – 5/32
6	3.0 – 3.5	1/8
8	3.0	3/32
10	2.5*	3/32

Table 5 - Return air sampling pipe hole numbers and sizes

*For code specific information see page ii.



Legend			
A	Sampling pipe	C	Return grille
B	Sampling hole	D	End cap (no hole)

Figure 19 - Return air sampling over an air handling unit grille

Installation considerations

The VESDA LaserFOCUS VLF-250 smoke detector provides very early warning smoke detection specifically for small environments.

The pre-engineered pipe network designs can support up to 6 sampling holes for single pipes and 8 sampling holes for branched pipe arrangements. The number of sampling holes used can be increased to 12, however, ASPIRE2 will need to verify that the additional sampling holes can be supported. Sampling holes are positioned according to the standards relating to conventional point detector placement.

The pre-engineered pipe network solutions described in sections *Single pipe network* on page 10 and *Branched pipe network* on page 11 achieved transport times of less than 60 seconds for open hole sampling and less than 90 seconds for capillary sampling.

Where the VESDA LaserFOCUS is located outside the protected area (e.g. in a corridor outside the room), consideration must be given to returning the detector exhaust air to the protected environment to balance the pressure differences that may exist. In the majority of applications, this is not necessary as pressure differences are minimal.

Where practical considerations fall outside pre-engineered designs or where pressure differences exceed 50 Pa, in situations where the detector is located outside the protected area, the solutions presented in this manual may not be suitable and it is recommended that alternate designs are verified by a suitably qualified installer using ASPIRE2.

The following points should be considered when installing the sampling pipe:

- minimize flexing in sampling pipes by supporting the pipe every 1.5 m (5 ft) or less, or at a distance described in local codes and standards.
- evenly arrange the sampling pipe network over return air grilles
- sampling pipes fit firmly into the tapered detector ports, **DO NOT glue** this connection
- allow sufficient movement at the detector to permit pipe removal for maintenance
- keep the exhaust deflector fitted to prevent foreign objects falling into the detector
- keep the return air 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 those entering the detector

Note: In protected areas sampling holes should face into the direction of airflow or point downwards in static airflow situations.

Note: You should try to keep the sampling holes evenly spaced.

Note: For code specific information see page ii.

Air sampling in a duct

For air sampling in a duct please refer to the VESDA System Design Manual for duct probe design. For code specific information see page ii.

1.5 Commissioning

General

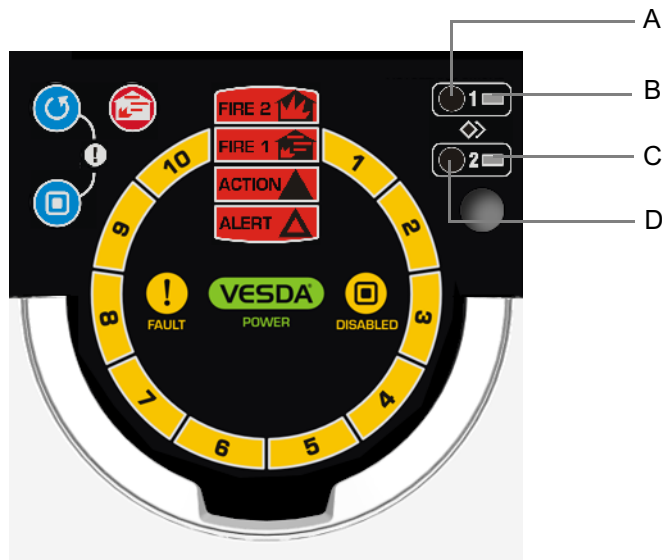
The VESDA LaserFOCUS has been designed to simplify commissioning processes. The AutoLearn function allows the unit to assess its environment and setup appropriate alarm and flow thresholds. The unit may also be programmed through VESDA System Configurator (VSC) software, for all programmable settings. For further information see *Factory Defaults* on page 31.

Note: Detectors should be commissioned with a smoke test.

Prior to commissioning the detector, check:

1. That the power is connected and on.
2. That the pipe network is clean and correctly fitted with all joints correctly seated and sealed (except the pipe which enters the detector which must not be glued).
3. That the exhaust deflector is fitted.

For code specific information see page ii.



Legend	
A	AutoLearn Smoke button.
B	AutoLearn Smoke indicator
C	AutoLearn Flow indicator
D	AutoLearn Flow Button

Figure 20 - Interface display

- Note:** It is important that the protected area is working under normal operating conditions when operating the AutoLearn processes.
- Note:** AutoLearn functions can be de-activated by a second press of the appropriate button this will leave the thresholds at their default settings and not at the settings prior to AutoLearn.

AutoLearn Smoke

AutoLearn Smoke is initiated by pressing the recessed button numbered 1, which is located under the field service access door.

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

The AutoLearn Smoke LED will remain on for the duration of the AutoLearn process. At the start of the process the alarm thresholds are set to the default values. During this learning cycle, alarm conditions can be reported. If an alarm condition occurs (Alert or higher alarm) AutoLearn will not complete its cycle. In this situation restart the AutoLearn process. If AutoLearn is stopped by you or due to an alarm condition, the alarm thresholds will be left at the default settings.

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

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

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

Alarm Level	AutoLearn Smoke Range
Alert	0.025 - 0.4 %obs/m (0.008 - 0.125 %obs/ft)*
Action	0.044 - 0.7 %obs/m (0.014 - 0.219 %obs/ft)*
Fire 1	0.063 - 1.0 %obs/m (0.020 - 0.313 %obs/ft)*
Fire 2	0.313 - 5.0 %obs/m (0.100 - 0.563 %obs/ft)*

Table 6 - AutoLearn Smoke range

*For code specific information see page ii.

AutoLearn Flow

AutoLearn Flow process is initiated by pressing the recessed button numbered 2, which is located under the field service access door. During the AutoLearn Flow process, the VESDA LaserFOCUS determines the average and peak air flow levels monitored over time and sets suitable alarm thresholds that will not give rise to false flow rates due to normal flow variations (such as might arise through air-conditioning related false alarms). The system will normalize the flow and then monitor the flow trend to set the flow fail thresholds.

The AutoLearn Flow indicator LED will remain on for the duration of the AutoLearn process. At the start of the process the flow thresholds are set to the default values. During this learning cycle, alarm conditions can be reported. If a flow fault is reached, AutoLearn will not complete its cycle. In this situation restart the AutoLearn process. If AutoLearn is stopped by you or due to a flow fault condition, the flow thresholds will be left at the default settings.

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

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

VESDA System Configurator (VSC)

The VESDA System Configurator is an optional tool that allows all VESDA detectors to be configured. All parameters can be set manually or previously saved configuration settings may be applied. Refer to the VSC documentation for details regarding the setting of these thresholds.

Commissioning smoke test

It is recommended that a smoke test be carried out to prove 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.

See the VESDA System Design Manual for details of the commissioning smoke test.

1.6 Detector Overview

Features

- Laser Based Absolute Smoke Detection
- Wide Sensitivity Range
- Programmable Alarm Thresholds
- Dual Stage Air Filtration
- Instant Recognition Display
- Instant Fault Finder™
- AutoLearn™ Smoke
- AutoLearn™ Flow
- Ultrasonic Flow Sensing
- Referencing (requires a VESDAnet Interface Card)
- Field Service Access Door
- Separate Event Logging
- Pipe Modeling Support Software – ASPIRE2™
- VESDA System Configurator (VSC) for field support

Description

The Instant Recognition Display of the VESDA LaserFOCUS smoke detector shows alarm levels and detector status information. The Smoke Dial, (see (F) in *figure 21, "LaserFOCUS detector front view,"* on page 23, a part of the Instant Recognition Display, provides clear information of a smoke event, relative to the Fire 1 Alarm Threshold. This display also identifies system and operational faults, when using the Instant Fault Finder function. Each segment of the Smoke Dial also corresponds to a specific fault condition.

A Field Service Access Door is provided to allow easy access to AutoLearn functions for detector commissioning. It provides access for filter replacement and connecting a PC for comprehensive configuration and diagnostics processes.

The detector uses Ultrasonic Flow Sensing to monitor the integrity of the sampling pipe network by detecting pipe air flow change. Ultrasonic flow sensing is not affected by temperature, humidity or pressure.

Detector history is provided by the non-volatile Event Logging feature. Smoke trend data, flow trend data, fault events, configuration events and operational events are recorded. Using VSC these event types can be filtered individually.

Applications

The VESDA LaserFOCUS can be used for open areas, return air grilles, or for cabinet protection in many small areas including:

- telecommunication facilities
- computer rooms
- control rooms
- storage facilities
- electrical and switching cabinets

For code specific information see page ii.

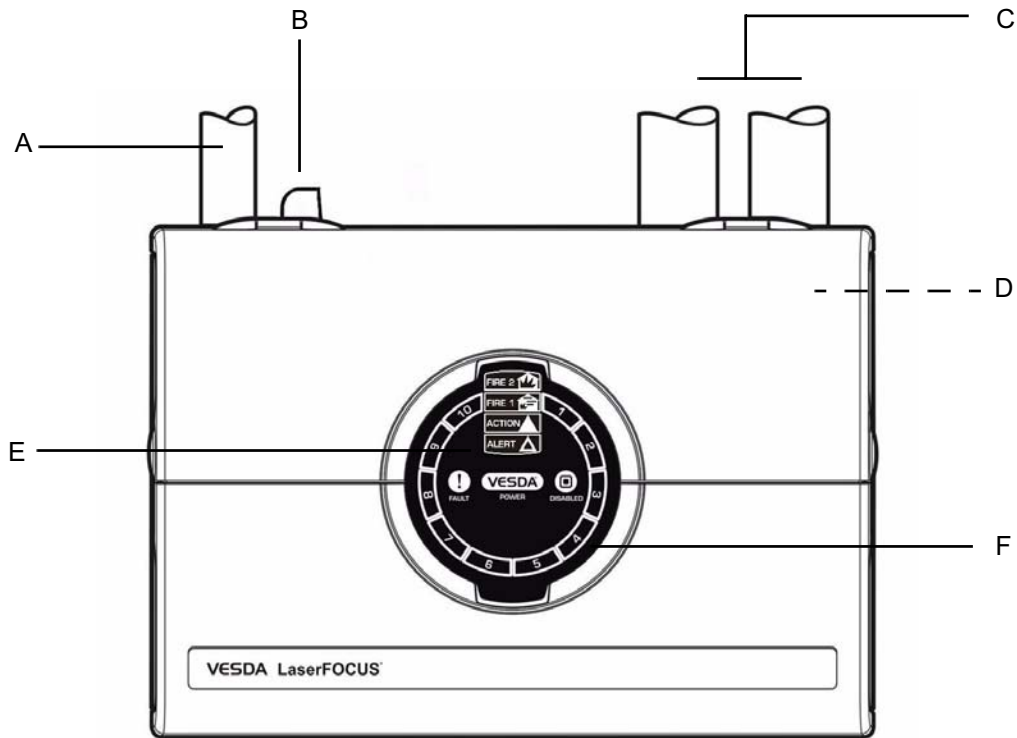
1.7 Product Interface

The VESDA LaserFOCUS provides the following information and control options without the need for additional configuration tools.

- Detector status: Normal, Alarm, Disabled and Fault.
- Alarm levels: Alert, Action, Fire 1 and Fire 2.
- Smoke levels relative to Fire 1.
- Detector fault types (Instant Fault Finder).
- Test, Reset and Disable.
- AutoLearn Smoke (setting alarm thresholds).
- AutoLearn Flow (setting baseline for normal air flow and flow thresholds).

Front view

Front view of the detector as installed and operating. This view shows cable and air sampling pipe entry points, the Instant Recognition display and the fitted exhaust deflector.

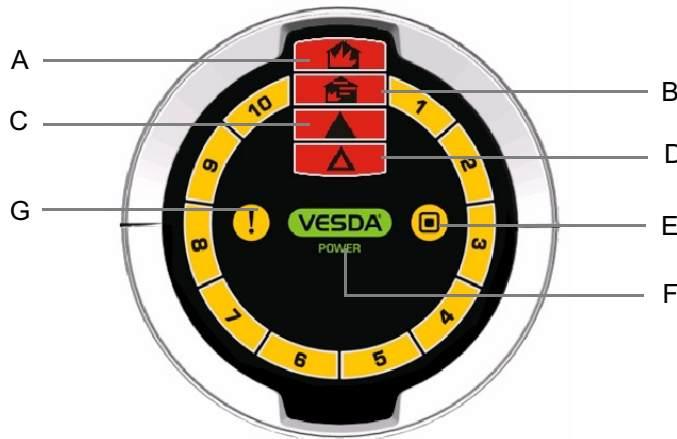


Legend			
A	Air inlet port	D	Rear cable entry (not shown)
B	Exhaust deflector	E	Instant Recognition Display
C	Cable entry ports (x2)	F	Smoke Dial (includes Instant Fault Finder)

Figure 21 - LaserFOCUS detector front view

Instant Recognition Display

The Instant Recognition display provides you with an immediate understanding of smoke levels relative to Fire 1 alarm threshold.



Legend			
	Option	Definition	LED Color
A	FIRE 2	Indicates the Fire 2 threshold has been reached.	Red
B	FIRE 1	Indicates the Fire 1 threshold has been reached.	Red
C	ACTION	Indicates the Action condition has been reached.	Red
D	ALERT	Indicates the Alert condition has been reached.	Red
E	DISABLED	Indicates the unit has been disabled (solid) or is in standby mode (flashing).	Yellow
F	POWER	Illuminates when the detector is powered.	Green
G	FAULT	Fault light continuously on indicates an Urgent Fault (UF). When flashing indicates a non-urgent fault (NUF).	Yellow

Figure 22 - Instant Recognition Display

Note: There are two sets of Instant Recognition display icons; both are shown throughout this manual. The international icon set can be identified by the lack of English text beside the icons.

Controls and indicators

Control buttons are accessed by opening the field service access door. This door is opened by pressing in the security tab, on the right side of the detector, with a flat screw driver and then lifting the door by the finger clips on each side of the door (see *Figure 3, "Field Service Access Door security tab and clip,"* on page 4).

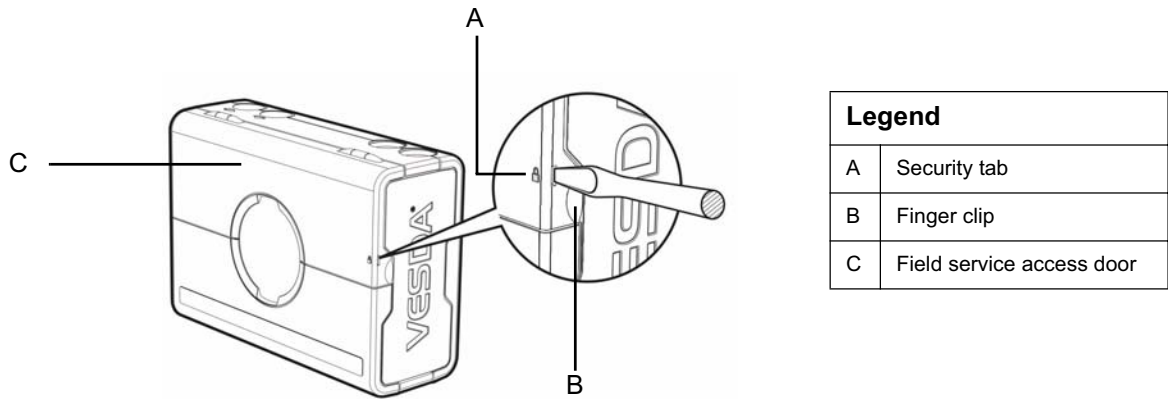
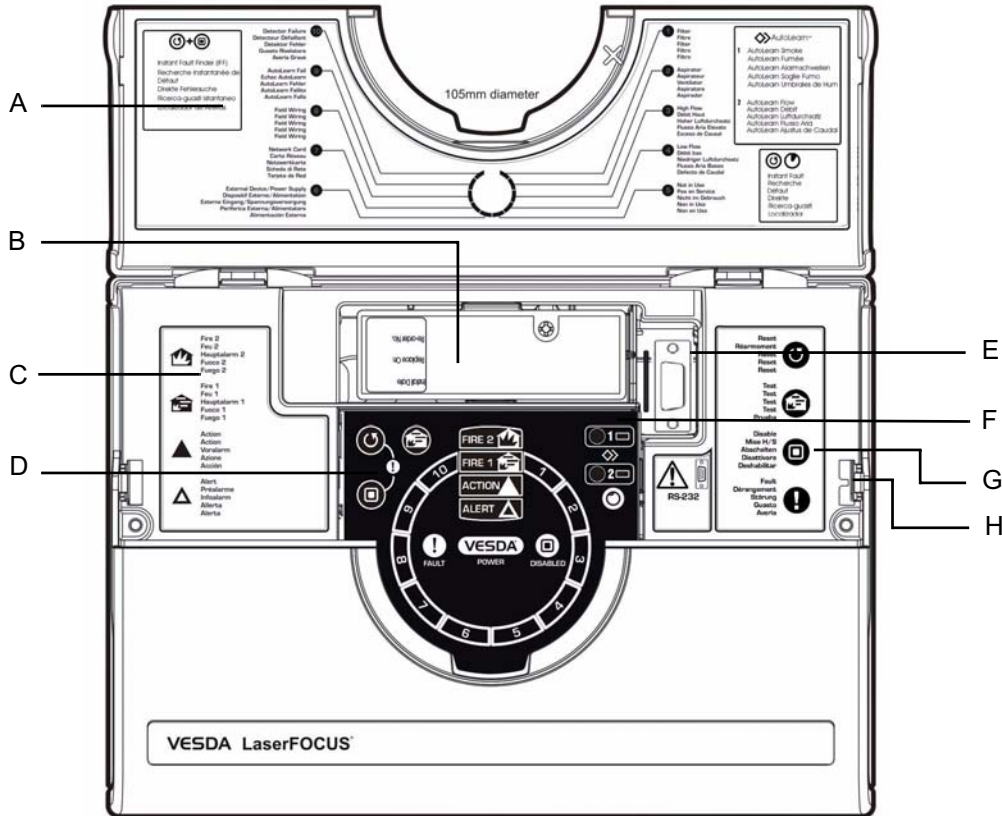


Figure 23 - Field Service Access Door security tab and clip

Interface information and control buttons



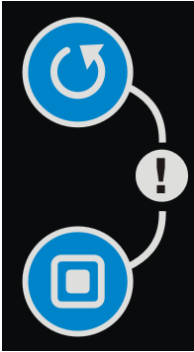

Interface information and control buttons are located behind the field service access door.



Legend	
A	Instant Fault Finder fault descriptions.
B	Dual stage air filter cartridge.
C	Alarm level definitions.
D	Control buttons - Reset, Disable, (Instant Fault Finder) & Test.
E	RS232 DB9F serial port.
F	Control buttons - AutoLearn Smoke, AutoLearn Flow.
G	Control button definitions.
H	Security tab.

Figure 24 - LaserFOCUS detector with field service access door open

Detector control buttons

Icon	Button	Use	Description
	Reset	Resets the system and resumes normal operation.	<p>Press and hold down this button to test the function of LEDs on the unit.</p> <p>To enable or lockout this button VESDA System Configurator (VSC) software is required.</p> <p>Release this button to clear latched faults and alarms. Alarm and fault lights will switch off, and if the system is still in alarm or fault mode, the lights will reappear after the appropriate delay.</p>
	Disable	<p>Disables the fire relay outputs from actuating and reports a fault.</p> <p>Pressing Disable for 6 seconds will put the detector into Stand-by mode.</p>	<p>This button allows the operator to toggle between disable and normal modes. When disabled smoke and air flow are not reported to the system (e.g. FACP).</p> <p>To enable or lockout this button VESDA System Configurator (VSC) software is required.</p> <p>The fan continues to run when VLF is disabled but stops when it is in stand-by mode.</p>
	Instant Fault Finder	Indicates current active faults on the detector.	<p>Pressing and holding in the Reset button and the Disable button together will show the fault type, by number, on the Smoke Dial.</p> <p>See “VLF Troubleshooting with Instant Fault Finder” on page 30. for the fault definitions.</p>
	Fire 1 Test	<p>Simulates a Fire 1 condition and the alarm relay is activated after the appropriate delay</p> <p>Note: This will initiate a Fire 1 Alarm.</p>	<p>By default this button is locked out. To activate this button VESDA System Configurator (VSC) software is required.</p> <p>Note: Notify the monitoring authority before testing commences.</p> <p>To activate, press and release the Fire 1 Test button. All the segments of the Smoke Dial, and alarm conditions up to Fire 1 are activated (after the configured delay period). Press the Reset button to stop the test and clear any latched alarms.</p> <p>Note: Remember to return the system to normal mode after the test is complete.</p>

	<p>AutoLearn Smoke</p>	<p>Automatically sets alarm threshold values based on the normal operating environment.</p> <p>See “AutoLearn Smoke” on page 20.</p>	<p>Pressing the recessed AutoLearn Smoke button initiates the automatic smoke alarm set-up mode. The LED, beside the button, will remain on for the duration of the AutoLearn process (up to 14 days which is also the default period). During this period the unit is online, alarms are communicated and default thresholds are active. To deactivate this function, press the AutoLearn Smoke button again.</p>
	<p>AutoLearn Flow</p>	<p>The detector automatically measures air flow to the pipes and sets the air flow threshold values.</p> <p>See “AutoLearn Flow” on page 21.</p>	<p>Pressing the recessed AutoLearn Flow button sets the airflow fault thresholds as well as normalizing the detector’s airflow. The LED, beside the button, will remain on for the duration of the AutoLearn process (up to 14 days which is also the default period). To deactivate this function, press the AutoLearn Flow button again.</p>

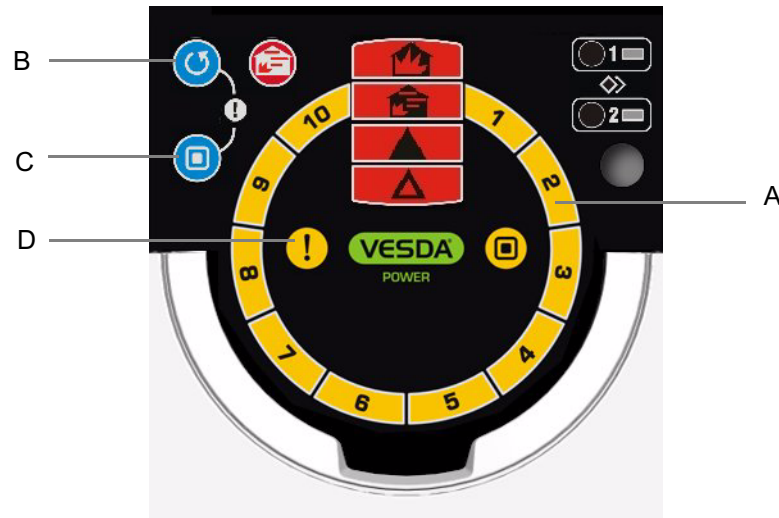
Table 7 - Detector Buttons

Smoke level & Instant Fault Finder displays

Under normal operating conditions the circular Smoke Dial displays smoke levels in sampled air. Through Instant Fault Finder, the Smoke Dial temporarily changes the segments into fault indicators, with each segment corresponding to a specific fault condition.

Smoke level display

The smoke level is displayed on the Smoke Dial (A) and provides incident information essential for effective response in very early warning situations. This display provides you with an instant understanding of the smoke event relative to the Fire 1 Alarm Threshold. Between 1 and 10 segments may illuminate. Each segment is equivalent to $\frac{1}{10}$ of a Fire 1 warning.



Legend			
A	Smoke Dial and Fault Type indicator.	C	Disable button.
B	Reset button.	D	Fault light.

Figure 25 - Smoke level and fault condition display

Instant Fault Finder

When a fault is registered on the detector, the fault light (D) remains on for Urgent Fault (UF) situations and flashes for Non-Urgent Faults (NUF).

The Instant Fault Finder function is operated by pressing the Reset and Disable buttons together. Instant Fault Finder provides rapid fault diagnosis and is an additional function of the Smoke Dial display. One or more segments of the Smoke Dial will illuminate, indicating the fault by number. The table below provides fault details and recommended actions.

VLF Troubleshooting with Instant Fault Finder

The Instant Fault Finder function aids rapid diagnosis of faults.

Fault	Type	Explanation	Action
1	Filter	Air filter needs replacement due to dust or smoke contamination or has reached the end of its life.	Replace the air filter with a new unit remembering to reset the filter fault.
2	Aspirator	Aspirator fault has occurred.	Initially replace the aspirator. If the fault remains replace the VESDA unit.
3	High flow	High flow fault present (urgent or non-urgent). Flow readings are above user set flow limits or the detector maximum flow	Check the pipe network for breakages. Also check the suitability of the pipe network in ASPIRE2.
4	Low flow	Low flow fault present (urgent or non-urgent). Flow readings are below user set flow limits or the detector maximum flow	Check the pipe network for breakages. Also check the suitability of the pipe network in ASPIRE2.
5	Not in use		
6	External Device/Power Supply Unit	External equipment signaling a fault via the General Purpose Input.	Inspect the external device and also check that the GPI is set to the correct mode. Also check that the EOL resistor is correctly connected.
7	Interface card (available at a later date)	Interface Card needs replacement.	Replace the Interface Card.
8	Field wiring	General Purpose Input or Interface Card wiring.	If no interface card is installed check the GPI wiring for an open circuit. If an interface card is installed refer to the card manual. Refer to <i>GPI</i> section of the <i>LaserFOCUS Manual</i>
9	AutoLearn fail	AutoLearn Smoke or Flow failed.	Repeat AutoLearn Smoke or Flow process. Inspect logs if repeated failures occur.
10	Detector failure	A fault has occurred that cannot be fixed.	Contact the supplier and replace the detector.

Table 8 - Instant fault finder diagnosis

1.8 Factory Defaults

Parameter	Allowed values	Default values
Alert Smoke Threshold 1 & 2	0.025% - 2.0% obs/m* (0.008% - 0.625% obs/ft.)	0.08% obs/m (0.025% obs/ft.)
Action Smoke Threshold 1 & 2	0.025% - 2.0% obs/m* (0.008% - 0.625% obs/ft.)	0.14% obs/m (0.0448% obs/ft.)
Fire-1 Smoke Threshold 1 & 2	0.025% - 20% obs/m* (0.008% - 6.25% obs/ft.)	0.2% obs/m (0.0625% obs/ft.)
Fire-2 Smoke Threshold 1 & 2	0.025% - 20% obs/m* (0.008% - 6.25% obs/ft.)	2.0% obs/m (0.625% obs/ft.)
Alert Verification Delay 1 & 2	0 - 60 seconds	10 seconds
Action Verification Delay 1 & 2	0 - 60 seconds	10 seconds
Fire 1 Verification Delay 1 & 2	0 - 60 seconds	10 seconds
Fire 2 Verification Delay 1 & 2	0 - 60 seconds	10 seconds
Alarm Latching Enable	Enabled or Disabled	Enabled
Fault Latching Enable	Enabled or Disabled	Disabled
Airflow – Urgent High Flow Fault	100% - 150%	130%
Airflow – Urgent Low Flow Fault	50% - 100%	70%
Airflow – Non-Urgent High Flow Fault	100% - 150%	120%
Airflow – Non-Urgent Low Flow Fault	50% to 100%	80%
AutoLearn Smoke	15 min. – 15 days	14 days
AutoLearn Flow	15 min. – 15 days	14 days
Smoke Test Button	Enable/Disable	Disabled
Threshold set 1 and 2	Day (1) & Night (2) / Disabled	Disabled

Table 9 - Factory defaults

*For code specific information see page ii.

1.9 Specifications

Power Supply

Supply Voltage	24 VDC nominal (18 - 30 VDC)*
Power Consumption @ 24 VDC	5.2 W nominal, 7.0 W in alarm*
Current Consumption @ 24 VDC	220 mA nominal, 295 mA in alarm*

*For code specific information see page ii.

Case

Dimensions (WHD)	245 mm x 175 mm x 90 mm (9 ⁵ / ₈ in. x 6 ⁷ / ₈ in. x 3 ¹ / ₂ in.)
Weight	2 kg (approx. 4.4 lbs)
IP Rating	IP30
Mounting	Upright, inverted or horizontal with appropriate mounting bracket
Maintenance access	Instant Fault Finder, Filter and Programming Port

Operating Conditions

Detector Ambient	0 °C to 40 °C (32 °F to 104 °F)
Sampled Air	0 °C to 40 °C (32 °F to 104 °F)
Humidity (non-condensing)	5% to 95 %

Sampling Network

Air inlet pipe	OD 25 mm (ID 21 mm) / IPS ³ / ₄ in. (OD 1.05 in.) Alternate pipe sizes can be modelled with ASPIRE2
Single pipe length	25 m (80 ft.) max.
Single pipe - Sampling holes	3-6 sampling holes pre-engineered For 7-12 sampling holes model with ASPIRE2
Branch (2) pipe length	15 m (50 ft.) max. per branch
Branch (2) - Sampling holes	2-4 sampling holes pre-engineered For sampling holes model with ASPIRE2
Return Air Sampling – U Shaped design	4-10 sampling holes pre-engineered

Area Covered250 m² (2500 sq. ft.)**Field Wiring**

Access	3 x 25 mm (1 in.) Cable entries (1 rear entry)
Terminals	0.2 mm ² - 2.5 mm ² (30 - 12 AWG)

Interfaces

Power In/Out.
Fire 1 Relay (changeover, 2A @ 30 VDC).
Action Relay (changeover, 2A @ 30 VDC).
Fault Relay (changeover, 2A @ 30 VDC).
General Purpose Input (clean contact).
External display port (with power limited output).
RS232 programming port.

Alarm Ranges

Alert, Action	0.025 – 2.0% obs/m (0.008 – 0.625% obs/ft.)*
Fire 1, Fire 2	0.025 – 20% obs/m (0.008 – 6.25% obs/ft.)*
Individual Delays	0 - 60 seconds
2 Threshold sets (1 & 2)	Day and night

For code specific information see page ii.

Display

4 Alarm State Indicators.
Fault and Disabled Indicators.
Smoke Level Indicators.
Instant Fault Finder.
Reset, Disable and Test Controls.
Smoke and Flow AutoLearn Controls and Indicators.

Event Log

Up to 18 000 events stored.

Smoke trend, flow trend, faults events, configuration events and operational events.

Date and time stamp.

AutoLearn Smoke & Flow

Minimum 15 minutes, maximum 15 days (default 14 days).

During AutoLearn, thresholds are NOT changed from pre-set values.

Referencing

Reference smoke level source for networked detectors (requires a VESDAnet Interface card).

Ordering Information

VESDA LaserFOCUS VLF-250	VLF-250-00, VLF-250-01, VLF-250-02
Filter Cartridge	VSP-005
Aspirator	VSP-715
VESDAnet Interface Card	VIC-010

1.10 Maintenance

Overview

The VESDA LaserFOCUS smoke detector continuously monitors its own operation and conducts frequent health checks. There are two serviceable items, the air filter cartridge and the aspirator.



Caution: Electrostatic discharge precautions need to be taken prior to removing the front cover from the detector otherwise damage may occur to the detector.

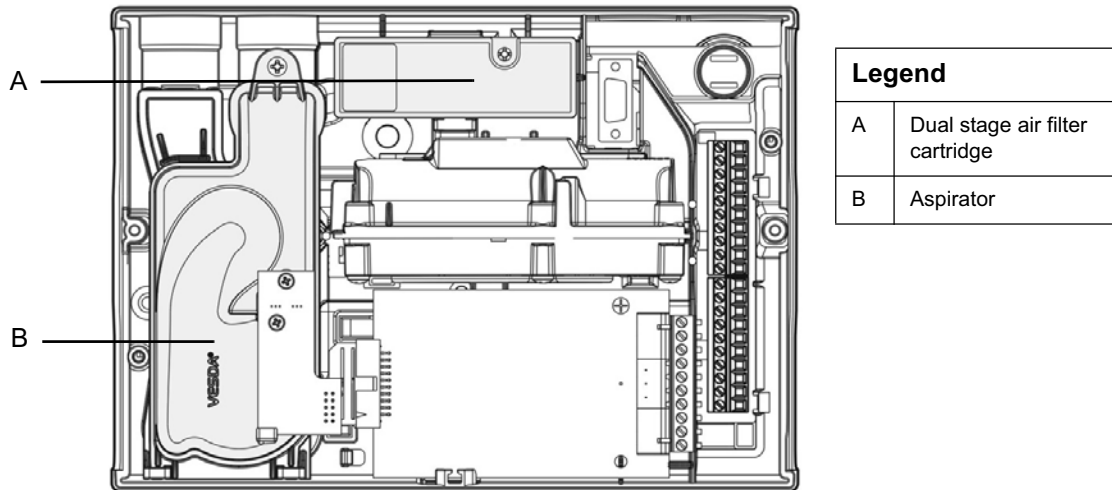


Figure 26 - Maintenance - replaceable items

Maintenance schedule

To maintain the VESDA LaserFOCUS smoke detector in peak working order follow the maintenance standards for your region and where no recommended standard exists see the table below. Please note, for environments that experience high levels of contamination, the frequency of maintenance will need to be increased. Maintenance should be conducted by a qualified service contractor.

Action	Frequency	Details
Check pipe network	6 monthly	Check pipe connections to ensure all pipe runs are intact and that pipe supports and joints are firm.
Airflow	Yearly	Check air flow via VSC software (refer to the VESDA System Configurator Manual). Compare the current reading with previous reading to determine if the flow rate has reduced.
Smoke test	Yearly	Conduct smoke tests and verify detector performance (refer to the System Design Manual). Compare response times with those previously recorded and investigate any discrepancies.
Check power supplies	Yearly	Test in accordance with suppliers instructions
Filter replacement	2 Yearly	Recommended change out period. The filter status can be checked via VSC software. Depending on the environment, the filter may require more frequent checking.
Clean sampling holes	As necessary	If frequent low flow faults occur clean the sampling pipe network by back flushing (refer to the System Design Manual).

Table 10 - Maintenance schedule

Filter replacement

The VESDA LaserFOCUS smoke detector uses a disposable dual stage air filter cartridge. This filter removes dust contamination from sampled air and provides a clean air bleed to preserve the detector chamber optics. The detector constantly monitors filter efficiency. To maintain the operational integrity of the smoke detector, it is recommended that the filter be replaced every 2 years, or when a filter fault occurs or more often for environments that experience high levels of contamination.

A fault is raised on the detector, when the filter needs to be replaced. During the replacement process the detector needs to be informed that a new filter has been installed.

- Note:** Prior to any work or maintenance being carried out on the VESDA LaserFOCUS take the necessary steps to advise the monitoring authority that power may be removed and the system disabled.
- Note:** Ensure the area surrounding the filter is clear of dirt and debris prior to replacement.
- Note:** The filter is for single use only, it cannot be cleaned and re-used.

Filter replacement steps

Ensure the detector remains powered up during filter replacement and a new filter cartridge is available:

1. Push in the security tab and lift up the field service access door (A).
2. Set the detector to 'Standby' mode by pressing the Disable button for 6 seconds. The Disabled LED begins to flash. After releasing the Disable button the disabled LED will slowly flash.
3. Undo the recessed retaining screw (C) and pull out the old filter (B).
4. Using your finger, firmly press the filter switch (D) (in the filter recess of the detector) 5 times within 5 seconds to confirm to the detector that a new filter is about to be installed (see inset). A LED next to the serial interface will flash each time you push the filter switch, and will continue flashing once you have successfully pressed the switch 5 times in 5 seconds.
5. Insert the new filter (VSP-005) and tighten the retaining screw.
6. Press the Disable button for 6 seconds to return the detector to normal operation.
7. Record the filter replacement date on the filter.
8. Close the field service access door.

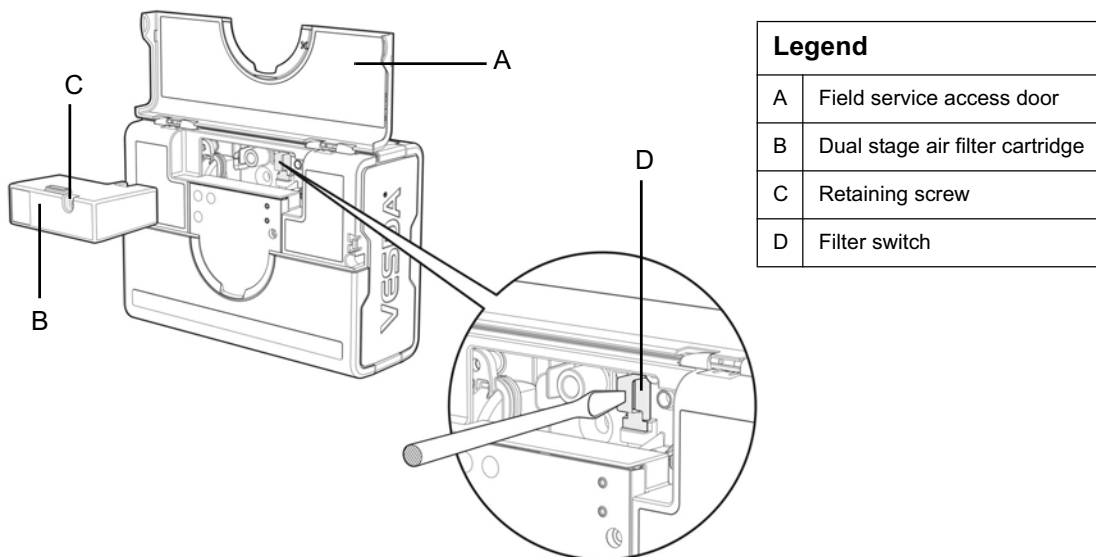


Figure 27 - Filter replacement

Aspirator replacement



Note: Prior to replacing the aspirator advise the monitoring authority that power will be removed and the system disabled.

Caution: Electrostatic discharge precautions need to be taken prior to removing the front cover from the detector otherwise damage may occur to the unit.

Aspirator removal (assumes normal mounting, see Figure 28):

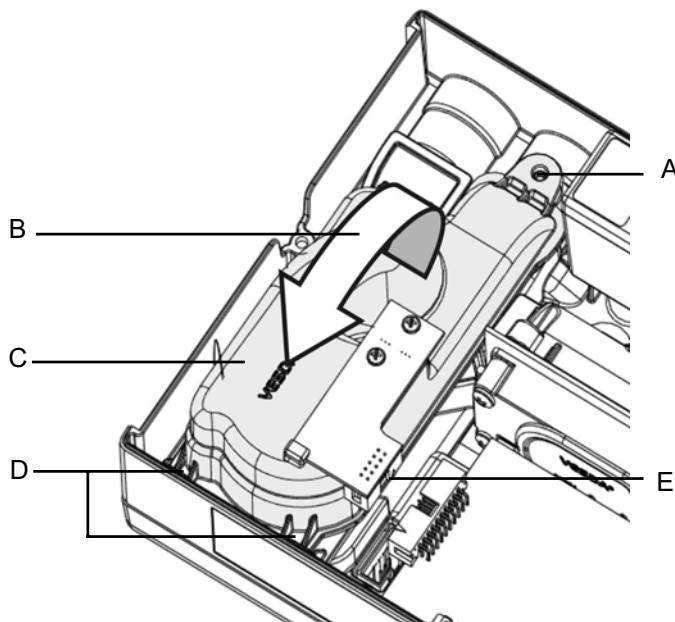
1. Disconnect power to the detector.
2. Push in the security tab and lift up the field service access door.
3. Unscrew the two front cover retaining screws, lift and swing down the front cover.
4. Only disconnect the fan wiring loom from the connection point (E) at the aspirator.
5. Undo the retaining screw on the aspirator (A).
6. Swing out the aspirator, then lift and remove it from the detector.

Note: Any time the aspirator is removed ensure the area surrounding the aspirator is clear of dirt and debris prior to replacement.

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

Aspirator replacement steps

1. Clip the aspirator (VSP-715) into the retaining clip (D) and swing it back into the detector.
2. Tighten the retaining screw (A) (**do not over tighten**).
3. Reconnect the fan loom to the aspirator (E).
4. Replace the front cover and screw it into place.
5. Close the field service access door.
6. Reconnect power to the detector.



Legend	
A	Aspirator securing screw
B	Swing aspirator out to remove
C	Aspirator
D	Retaining clip points
E	Fan loom connector must be disconnected here

Figure 28 - Aspirator replacement

Glossary

A	Aspirator	Impeller type fan used to draw sampled air into the detector.
C	Capillary Tubes	Flexible tubes attached to the sampling pipe network for sampling specific areas or objects away from the sampling pipe.
D	Disable	Disables the fire relay outputs from actuating (previously known as Isolate) and indicates a fault.
	Dual Stage Air Filter Cartridge	A disposable air filter cartridge used in VESDA LaserFOCUS detectors that removes dust contamination from sampled air and provides a clean air bleed to maintain the Laser chamber optics.
E	Event Log	All VESDA detectors provide internal data logging of events which have occurred in the VESDA protected zone.
F	FCC Compliance	Federal Communications Commission.
	Fire 1	This indicates a serious situation and may lead to automatic generation of a normal fire alarm.
	Fire Alarm Control Panel (FACP)	A panel which all fire detection products report their status to.
G	General Purpose Input (GPI)	The General Purpose Input is a programmable input.
H	High Airflow Environment	Where there are 10 or more air exchanges per hour.
I	Instant Fault Finder	Illuminates one or more segments of the Smoke Dial with corresponding fault numbers.
L	LaserFOCUS	An air sampling smoke detector using light scattering to report smoke obscuration.
O	Obscuration	The reduction in light passing through a uniform length due to the presence of particulates.
R	Relay	The connection on a VESDA 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).
S	Sampling Network	The pipe network constructed to allow the VESDA detector to draw air for sampling.
	Sensitivity	Relative 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, under identical smoke build-up conditions.
V	VESDA	Brand name for the range of smoke detectors.
	VSC	VESDA System Configurator, a PC based program tool.

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