VESDA | Commissioning

xtralis®

Agenda

CONTENTS

- Introduction to Xtralis
- Introduction to Aspirating Smoke Detection (ASD) and Main Applications
- Product Overview (VESDA and VESDA-E)
- System Design and Practical Exercise (Concept, Layout AutoCAD, ASPIRE Software)
- Installation Details
- **Commissioning, Testing and Maintenance.**

Module Objectives

Commissioning, Testing, and Maintenance

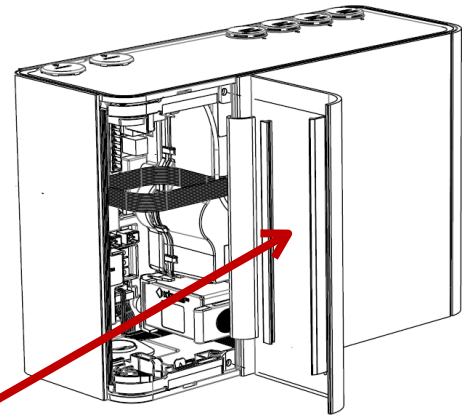
Things you will learn:

- Pre-commissioning requirements
- Connecting to device
- Configuration parameters
- Testing steps (software, functional smoke test and performance test)
- Handing over
- Firmware Upgrade

Commissioning

1. Pre-commissioning

- Obtain copy of ASPIRE printout (IDP) and site layout.
- Visually inspect the sampling pipe network and confirm correct installation
- Make sure pipes network are cleaned (flushed).
- Record the serial # from each VESDA device (detectors, displays, and remote relay modules)
- Check cables if all installed properly
- Power up system
- Initial system check



VESDA-E Serial Number Location

VESDA Power Supplies

Acceptable 24VDC Power Supplies:

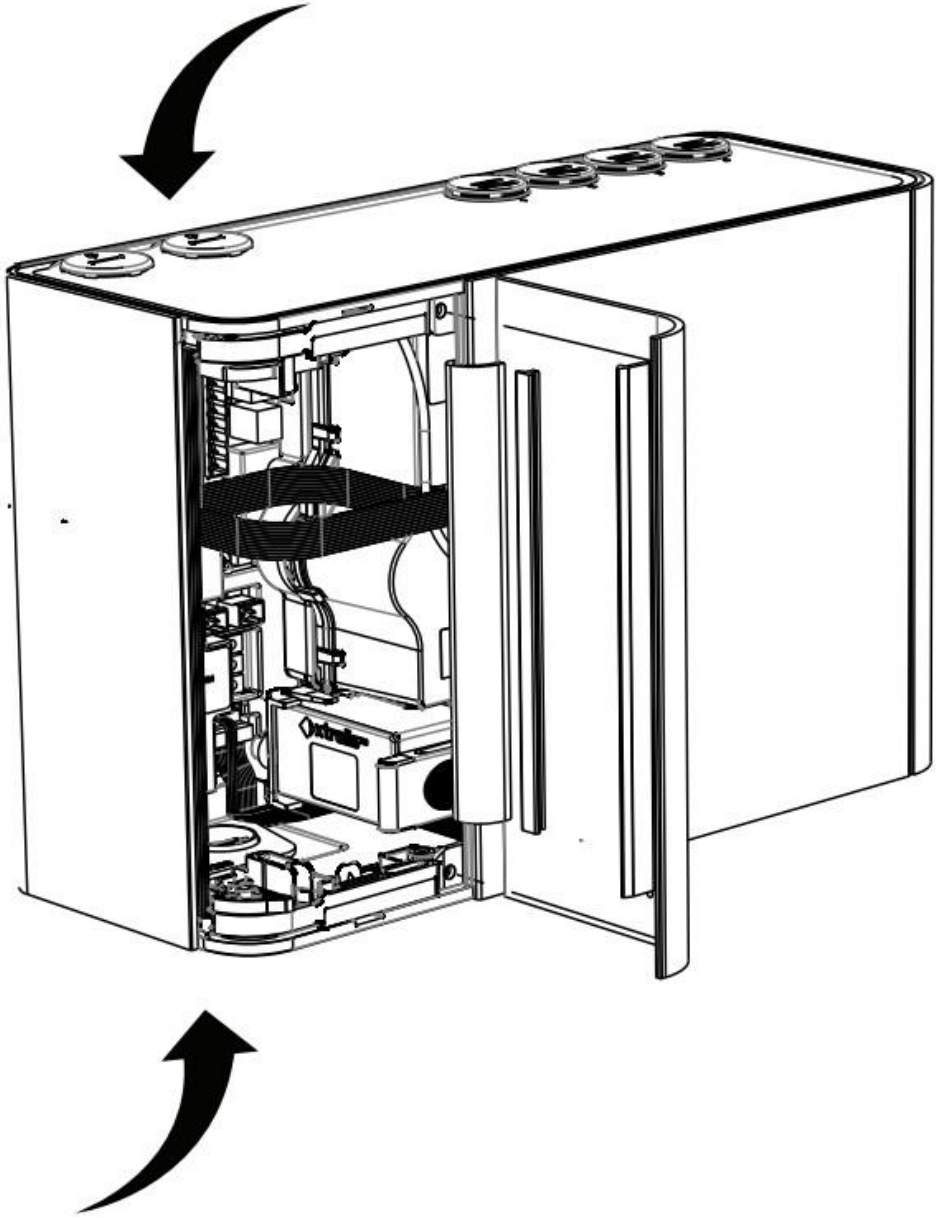
- VPS-215-E5
- VPS-220-E5
- VPS-250-E5
- VPS-220-STX5/ VPS-220-STX-SLV5
- VPS-250-STX5/ VPS-250-STX-SLV5
- **VPS-100US**
- **VPS-300US**
- **VPS-VEA-115UL**
- VPS-VEA-230UL

The model numbers are recommended by Xtralis.

Cabling Inlets

- The VESDA-E contains four inlets for power, relay and network cabling, located on the upper and lower sides of the detector base.
- The holes have a diameter of 26 mm (1.02 inch).

Note: To maintain the specified IP rating, cable glands or conduit must be used.



Connections

- All connections are made on the Detector Termination Card
- 24V to each module
- Maximum cable size 2.5mm² (14AWG)

Power

A	Power Out
B	Power In

VESDAnet

C	VESDAnet B
D	VESDAnet A

Relays

E	1 - Disable (Isolate)
F	2 - Minor Fault
G	3 - Urgent Fault
H	4 - Alert
I	5 - Action
J	6 - Fire 1
K	7 - Fire 2

Comms

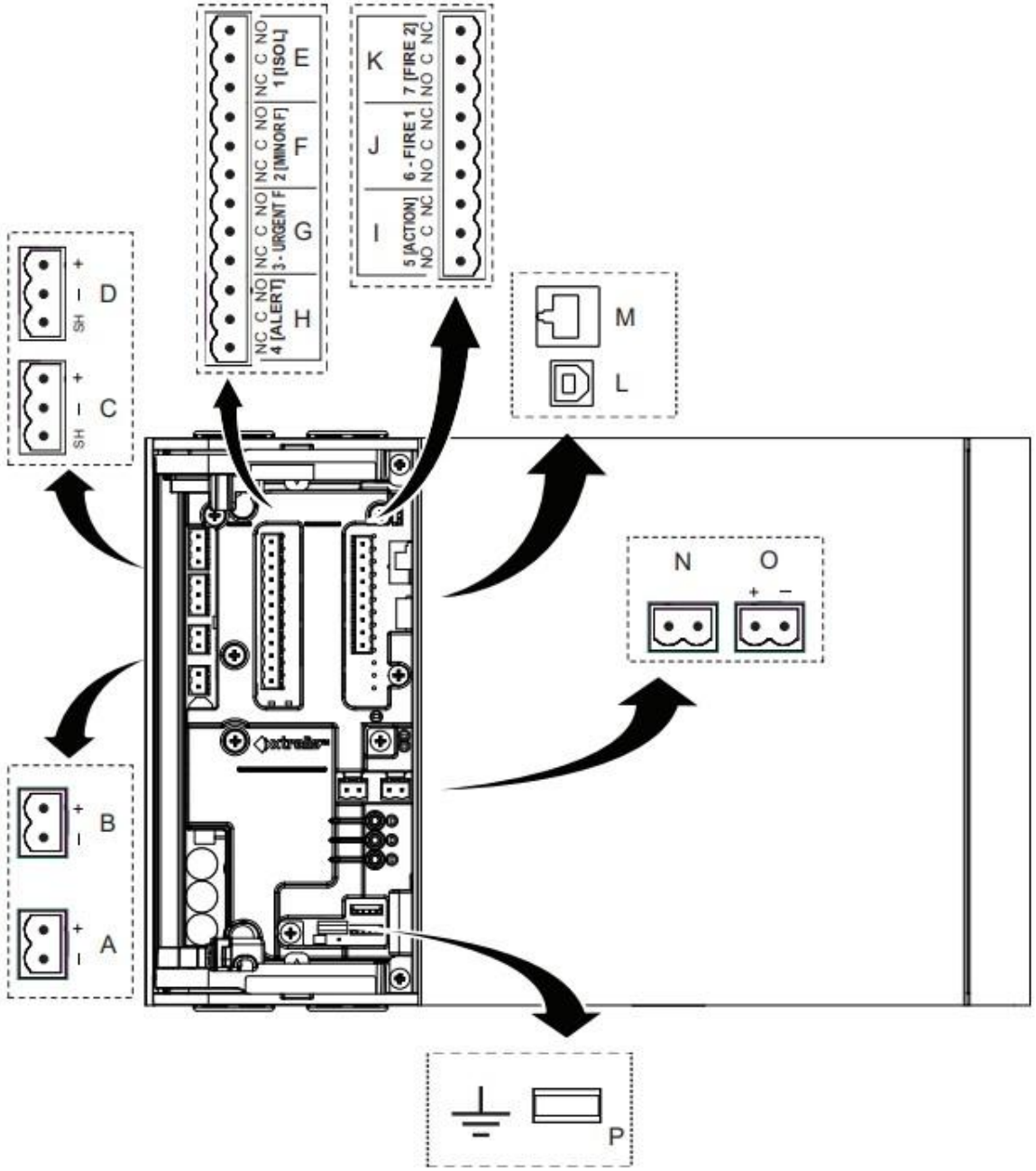
L	USB
M	Ethernet

GPI

N	Monitored GPI
O	Unmonitored GPI

Ground

P	Ground Reference Terminal



Connections (VES)

Power

A	Power Out
B	Power In

VESDAnet

C	VESDAnet B
D	VESDAnet A

Comms

R	Ethernet
S	USB

GPI

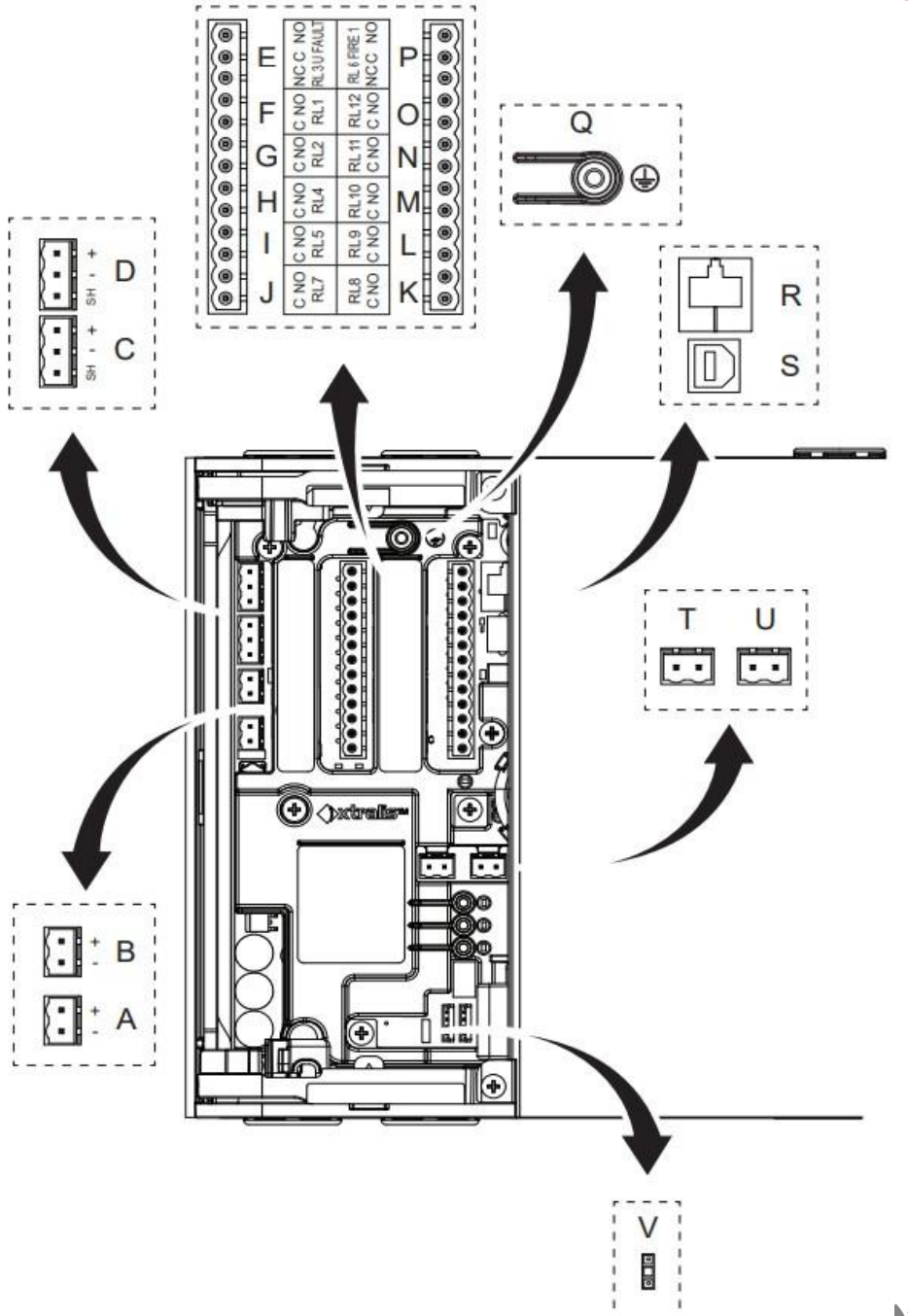
T	Monitored GPI
U	Unmonitored GPI

Ground

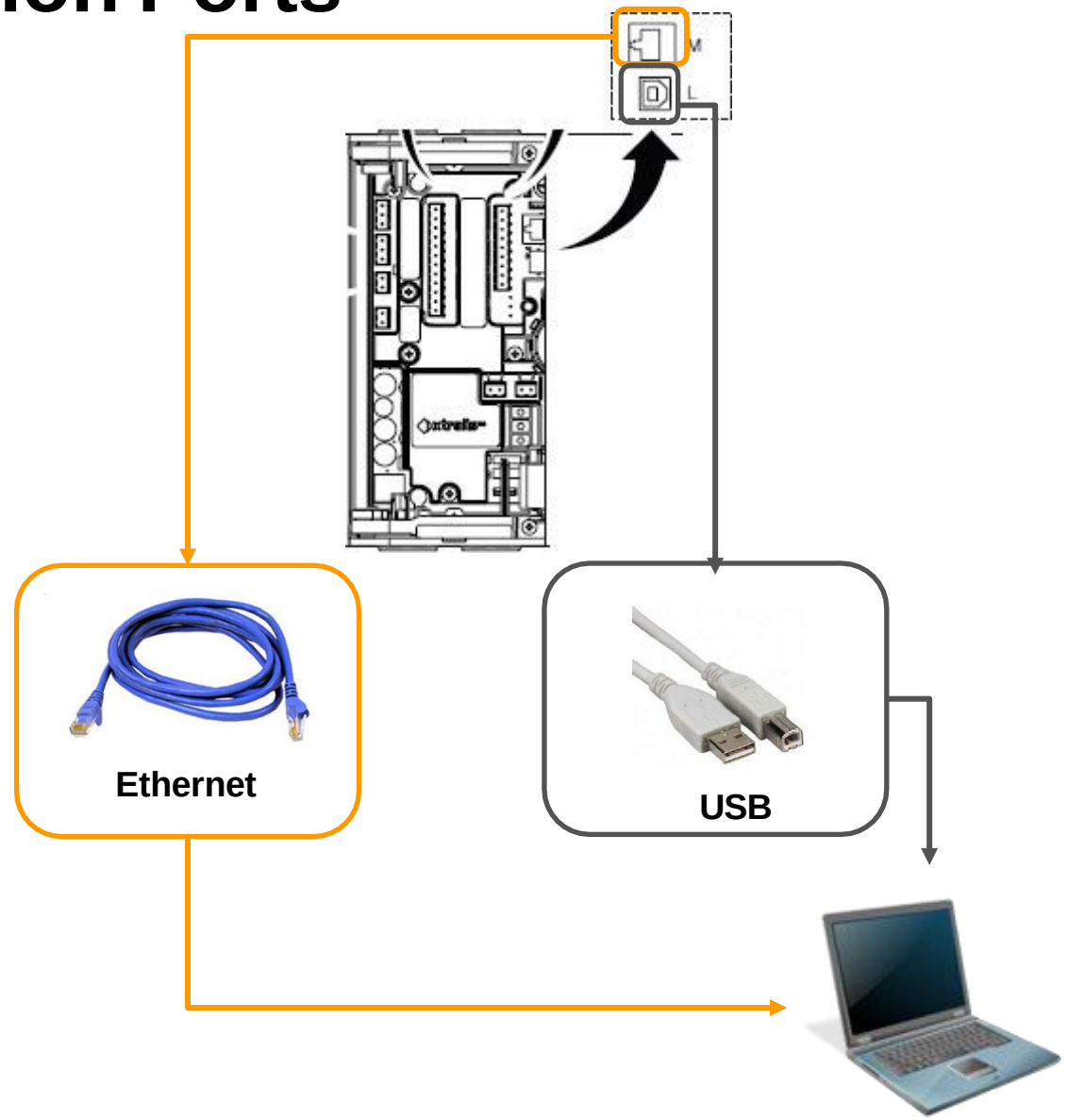
V	Jumper for ground fault monitoring
Q	Chassis Ground Terminal

Relays

E	3 – Urgent Fault
F	1 – Disable
G	2 – Minor Fault
H	4 – Alert
I	5 – Action
J	7 – Fire 2
K	8 – First Alarm Sector 1
L	9 – First Alarm Sector 2
M	10- First Alarm Sector 3
N	11 – First Alarm Sector 4
O	12 - Scanning
P	6 – Fire 1



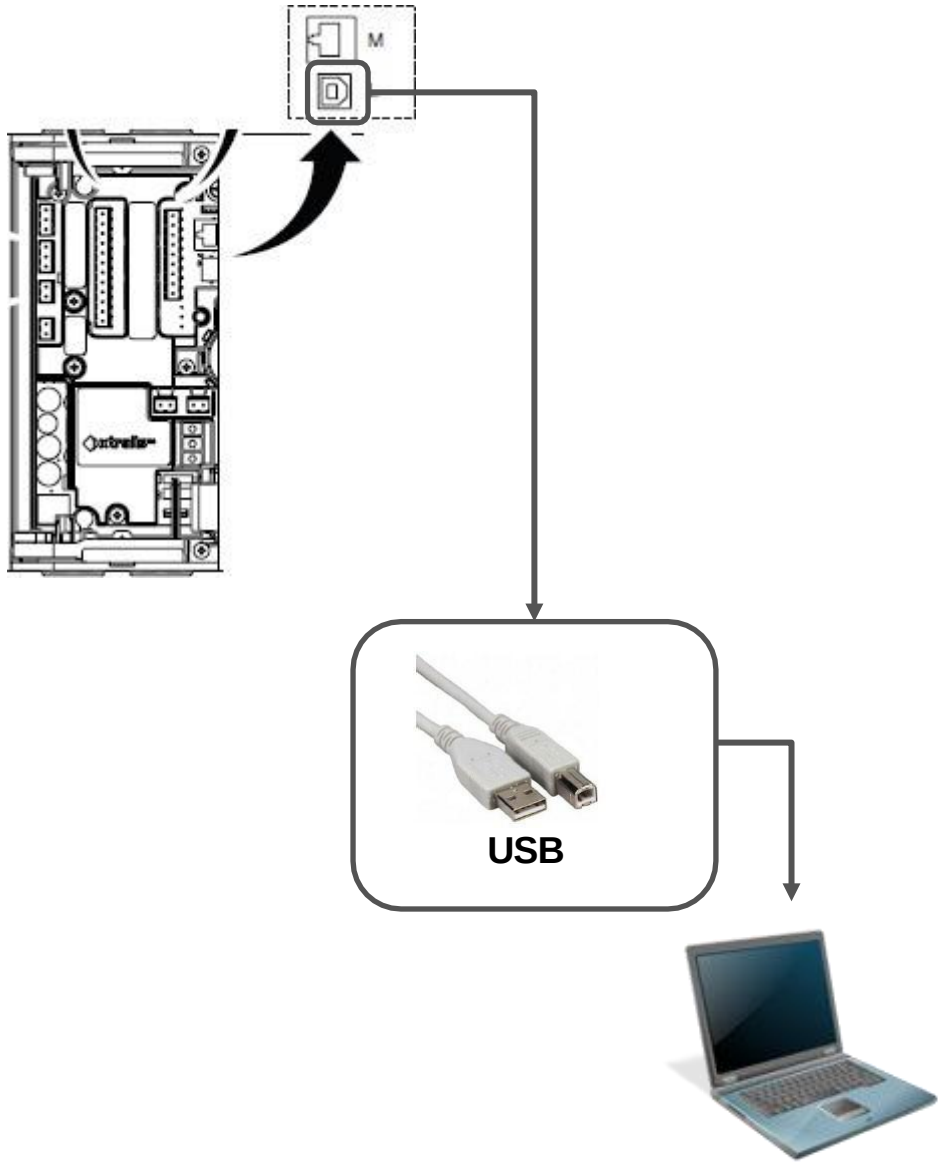
Communication Ports



Communication Ports

USB

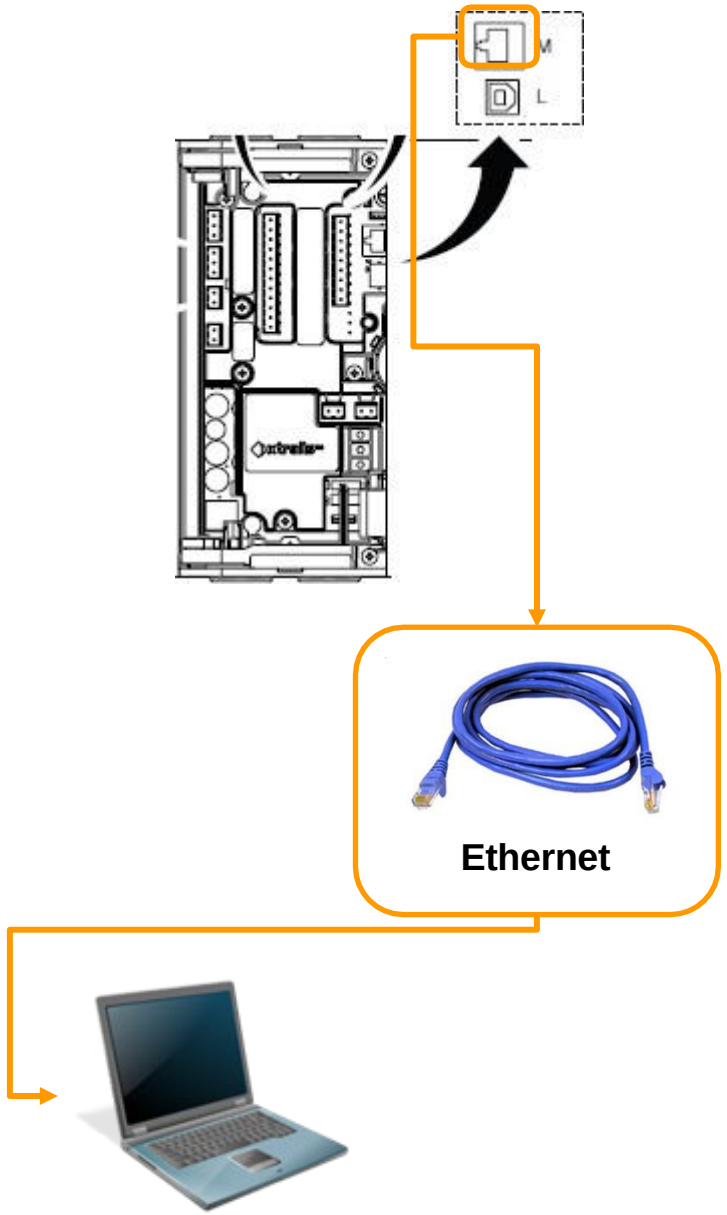
- For initial configuration and local maintenance or servicing.
- For initially set up on Ethernet



Communication Ports

Ethernet

- For a permanent network connection to a network switch or router with RJ45 Ethernet cable



Powering Up & Preliminary System Check

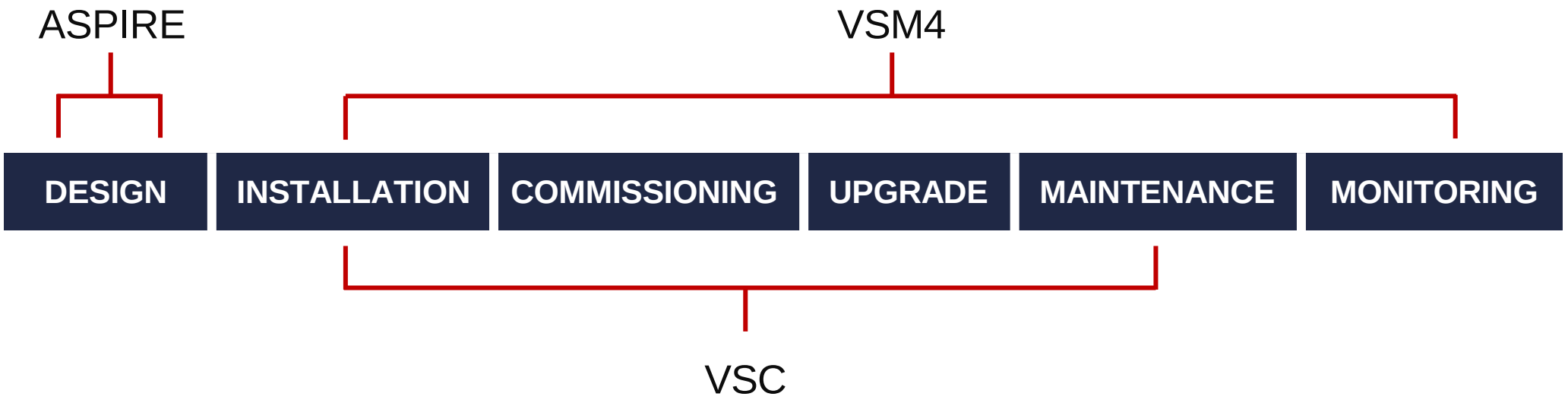
- After installing the detector, it is necessary to power up the system. The power up sequence lasts approximately 15 seconds.
- VESDA Detectors are “always on" device.
- On power up:
  - The Power LED illuminates and the detector runs a series of self-diagnostic tests.
  - If there is a fault, the Fault LED illuminates.
  - The aspirator starts up and air may be felt flowing out of the exhaust port
- It is normal for the detector to display airflow faults immediately after the first power up and until the air flow normalization step is done.
- A preliminary system check is required after installing the detector, before it is commissioned for use.
- To perform the preliminary system check:
  - Power up the detector by connecting the power supply to the Power In terminal.
  - Check that the display is functioning.
  - Check that the aspirator is functioning by determining whether air is being expelled from the exhaust port.

Commissioning

2. Configuration and Thresholds

- Configure the system (zones, remote modules, relays, GPI, reference, Ethernet)
- Set pipes in use & Set aspirator speed following to the ASPIRE calculations.
- Set flow and smoke thresholds (manually or using AutoLearn functions)
- Normalize airflow
- Print VSC file

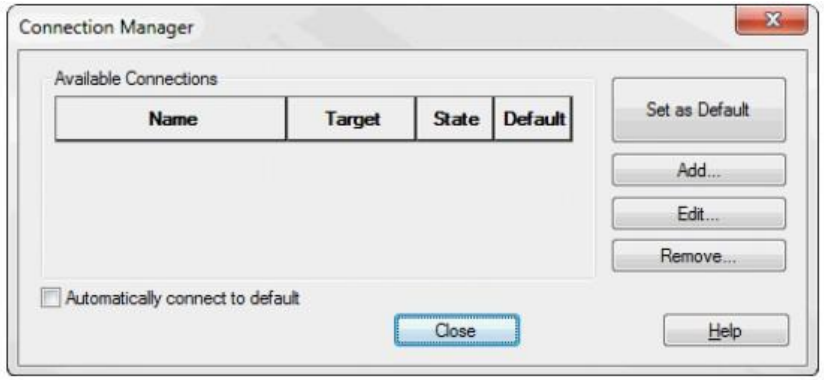
Xtralis Software

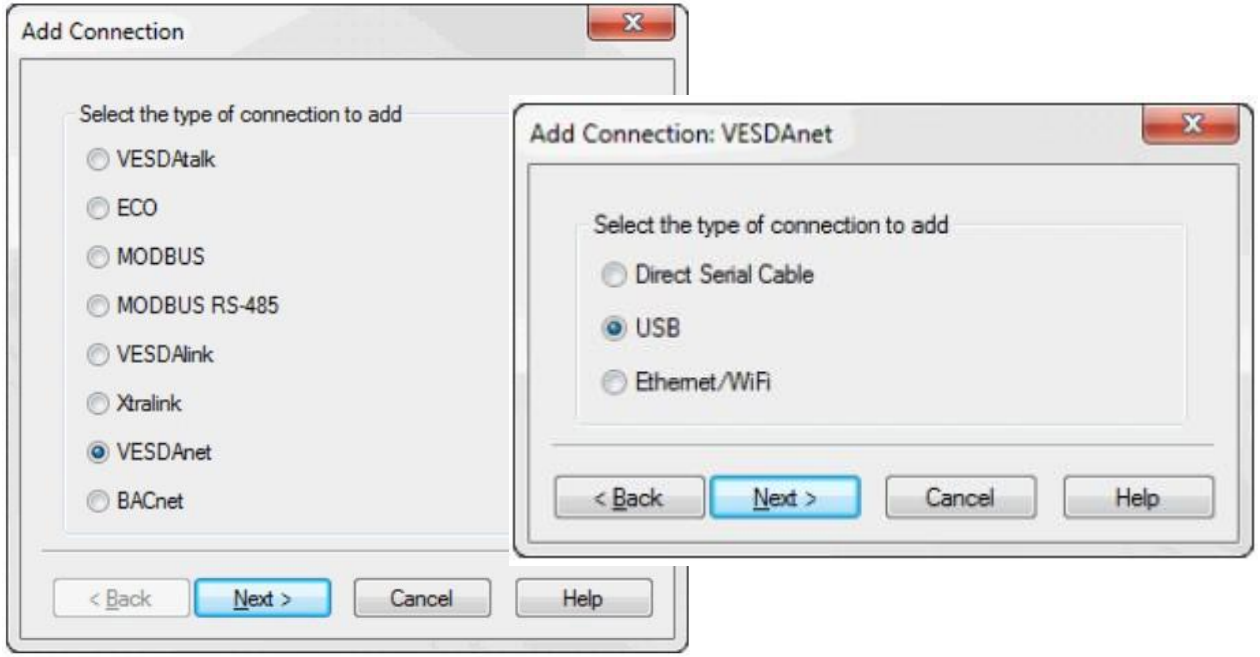


Configuration by VSC - USB

To configure VESDA panels using VSC:

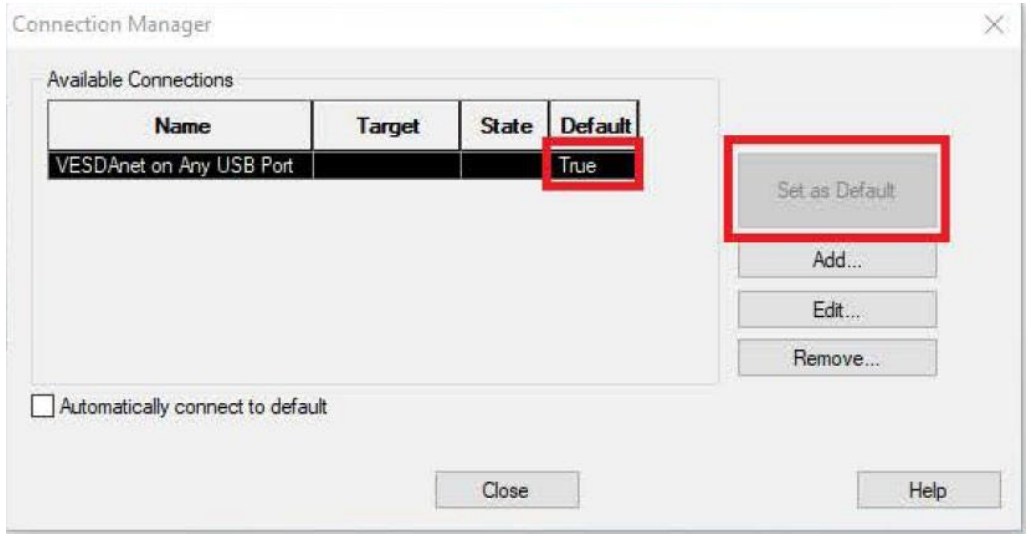
- Run “VSC”.
- Go to “Connection” and select “Connection Manager”.
- “Add…”.
- Select the type of connection and complete the connection creation.

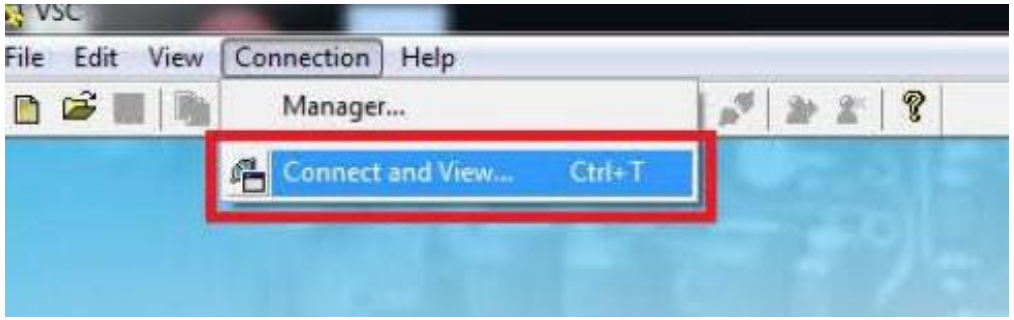




Configuration by VSC - USB

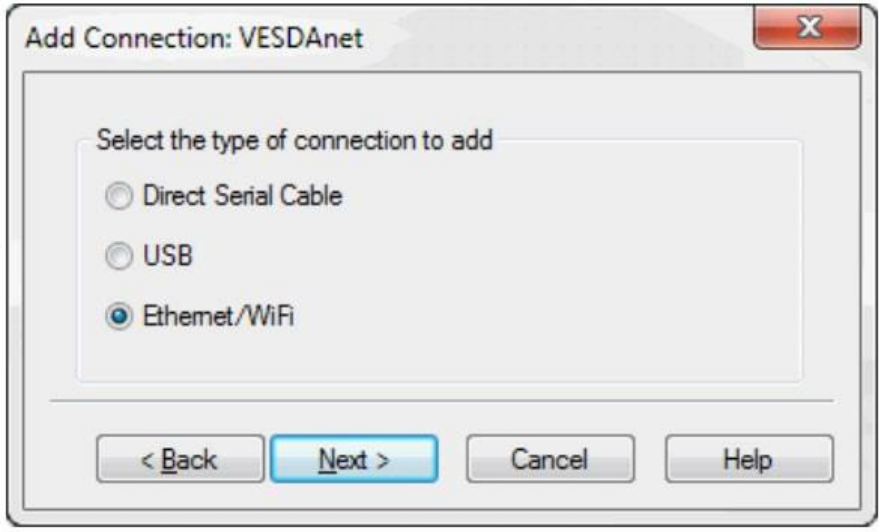
- Set the connection to Default.
- Close Connection Manager.
- Go to “Connection” and select “Connect and View…”.
- Check the connection name and press “OK”

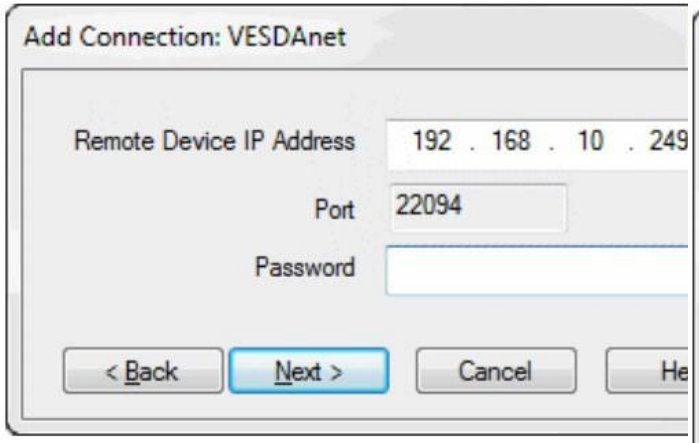


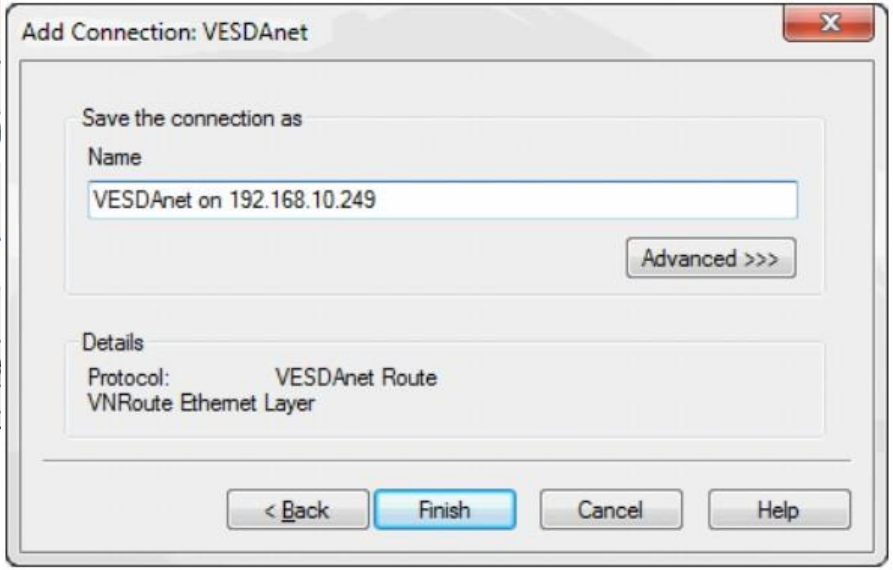


Connection VSC – Ethernet

- Select Ethernet, then select Next
- Enter the IP address of the detector. Enter the password that has been set for Ethernet authentication. Select Next
- Enter a unique name for the Connection or accept the pre-generated name, then select Finish







The IP address and password of the detector is configured in the Ethernet options section during initial setup with a USB connection.

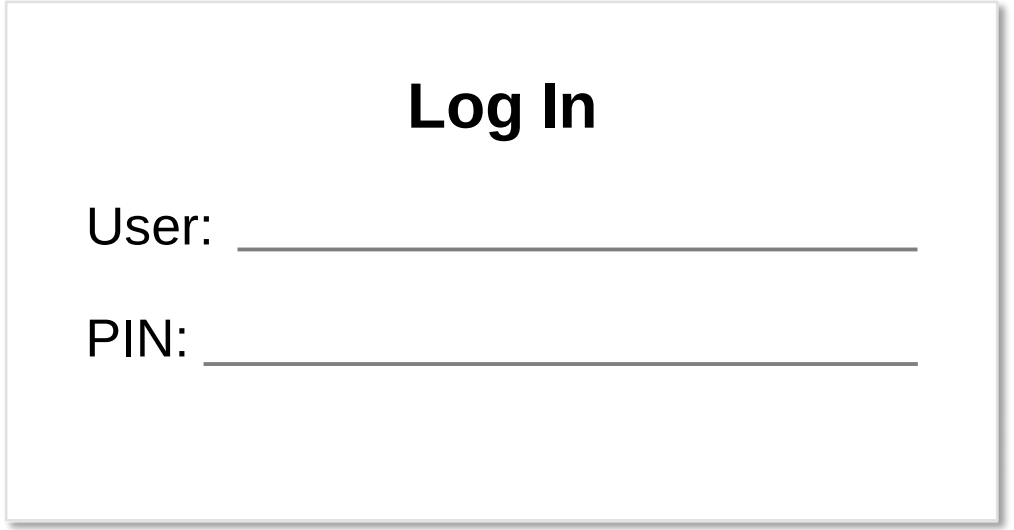
Programming – Log On

Log on to the VESDA Network

- User (USR) 1111 : **The user can view the event log and change the date and time.**
- Administrator (ADM) 1413 : Administrator level access is available to most functions. These include setting alarm thresholds, normalizing air flows, reset filter, and defining the relay configuration.
- Distributor (DST) 1451: Distributor level allows unlimited access to all the system commands and parameters. can do upgrade firmware.

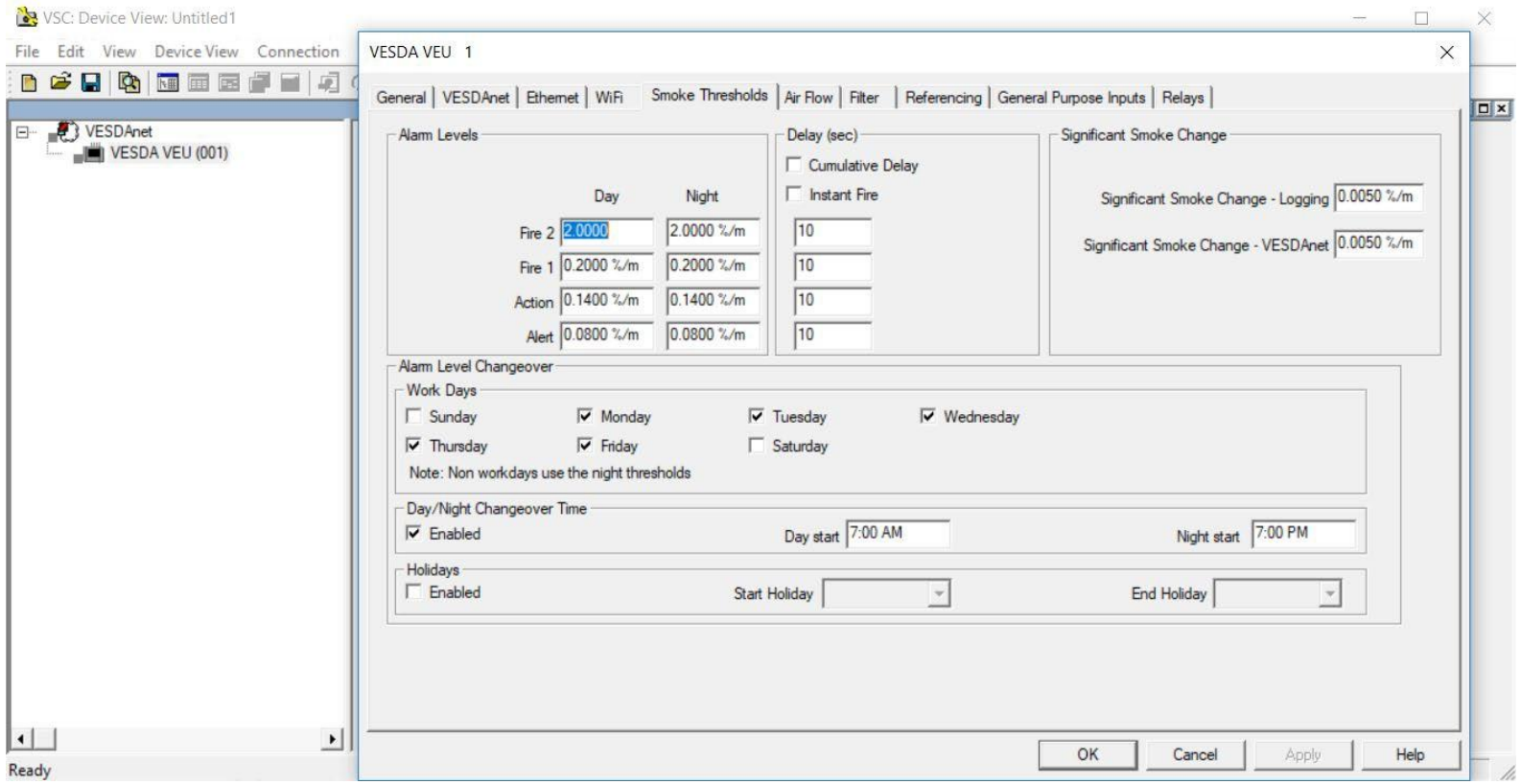
- For VLF (VESDAtalk without VESDAnet Card):

USR (7227), ADM (7213) & DST (7244)



Configuration and Thresholds

- Configure the system:
  - Zones
  - Remote Modules
  - Relays
  - GPI
  - Reference
  - Ethernet
- Set:
  - Set Aspirator Speed
  - Set Pipes in use
  - Flow Thresholds
  - Smoke Thresholds
  - Normalize Airflow
- Print VSC file

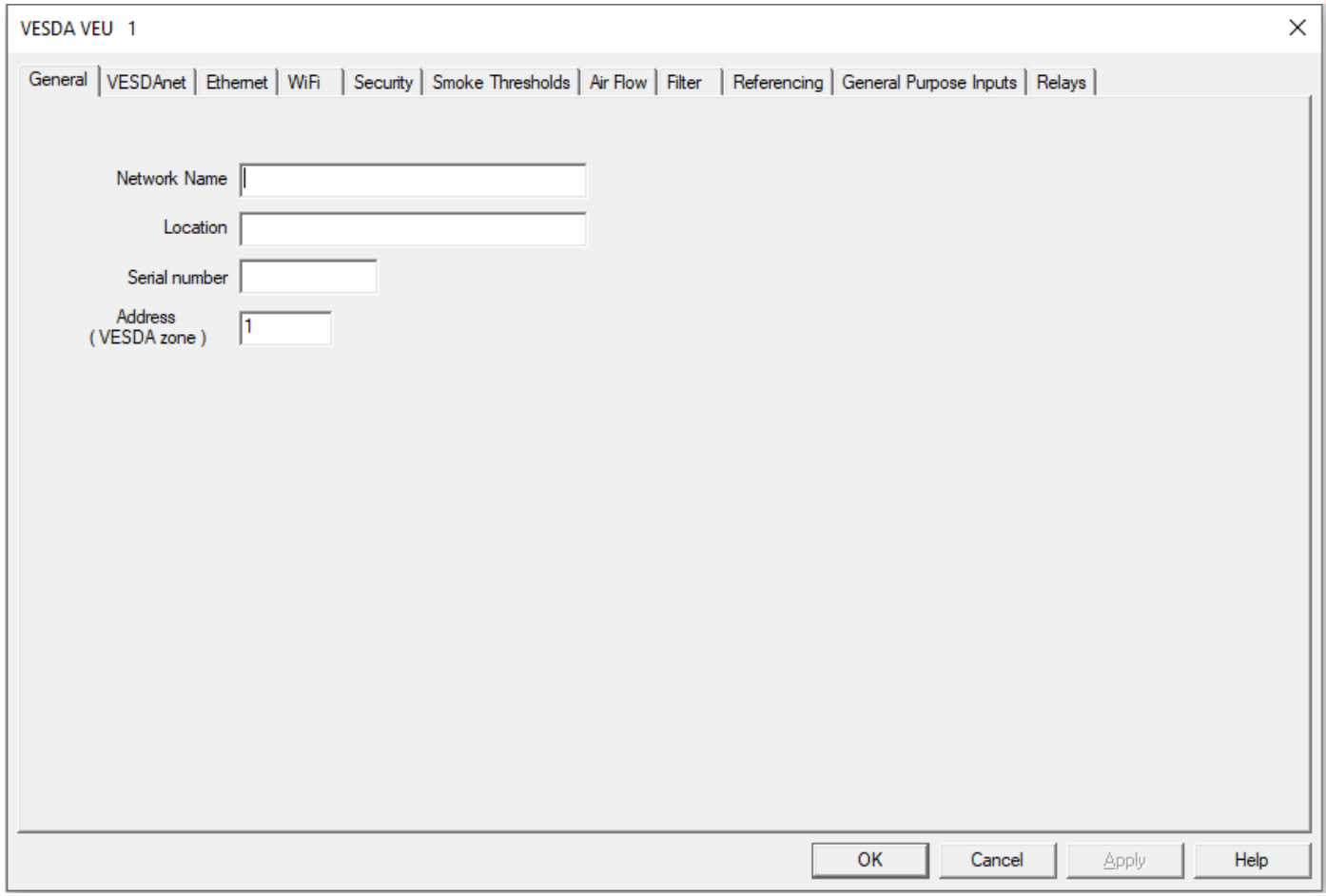


VESDA units are supplied with default settings.
Make sure to program the VESDA unit to fit with site situation and requirements.

VSC Configuration - General

The General configuration options for the detector are as follows:

- Network Name.
- Location.
- Serial Number.
- Address (VESDA Zone).

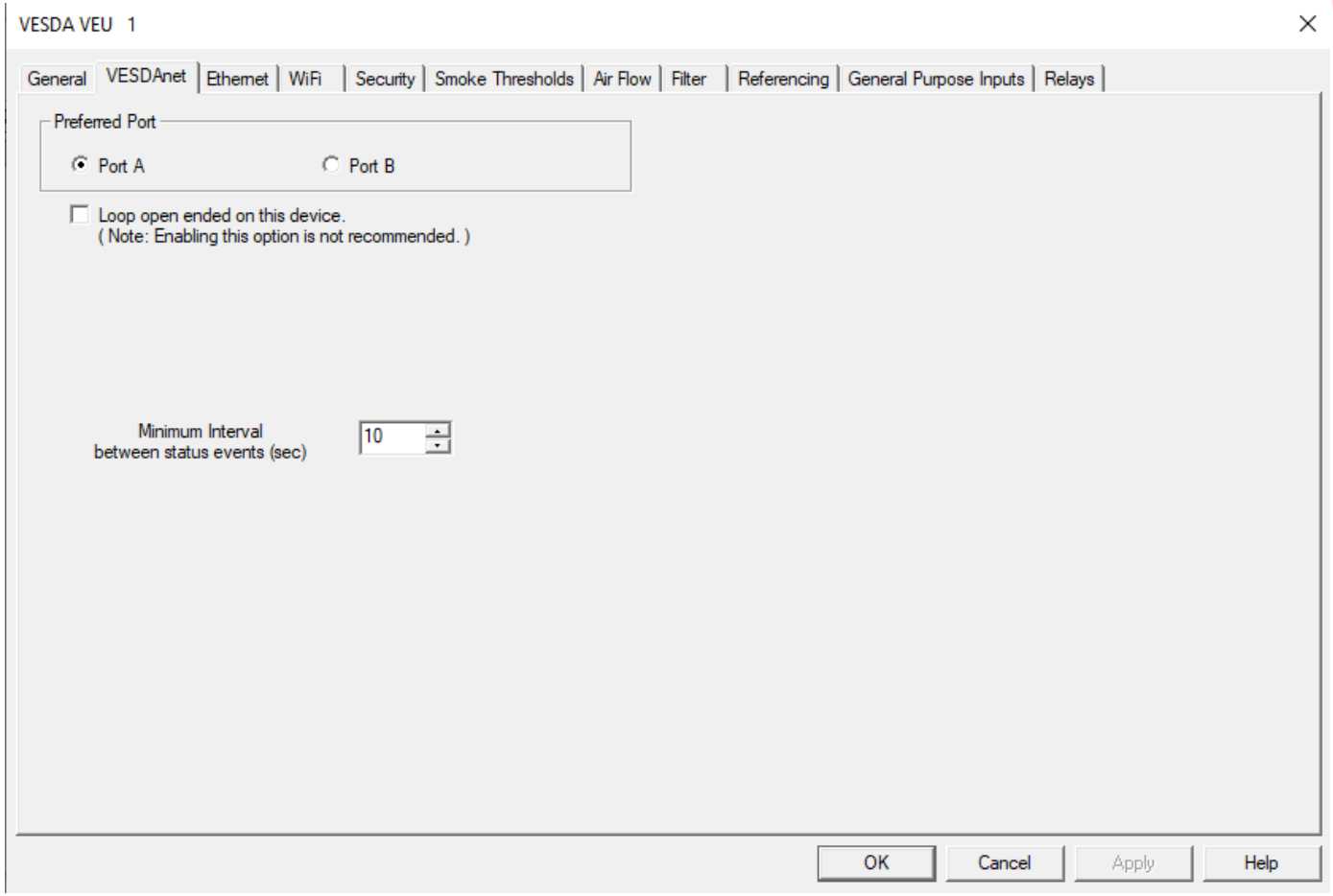


VSC Configuration - VESDAnet

The VESDAnet options provide the ability to control network data transmission behavior for VESDAnet connections.

The VESDAnet configuration options for the detector are as follows:

- Preferred Port.
- Loop Open Ended on This Device.
- Minimum interval between status events.

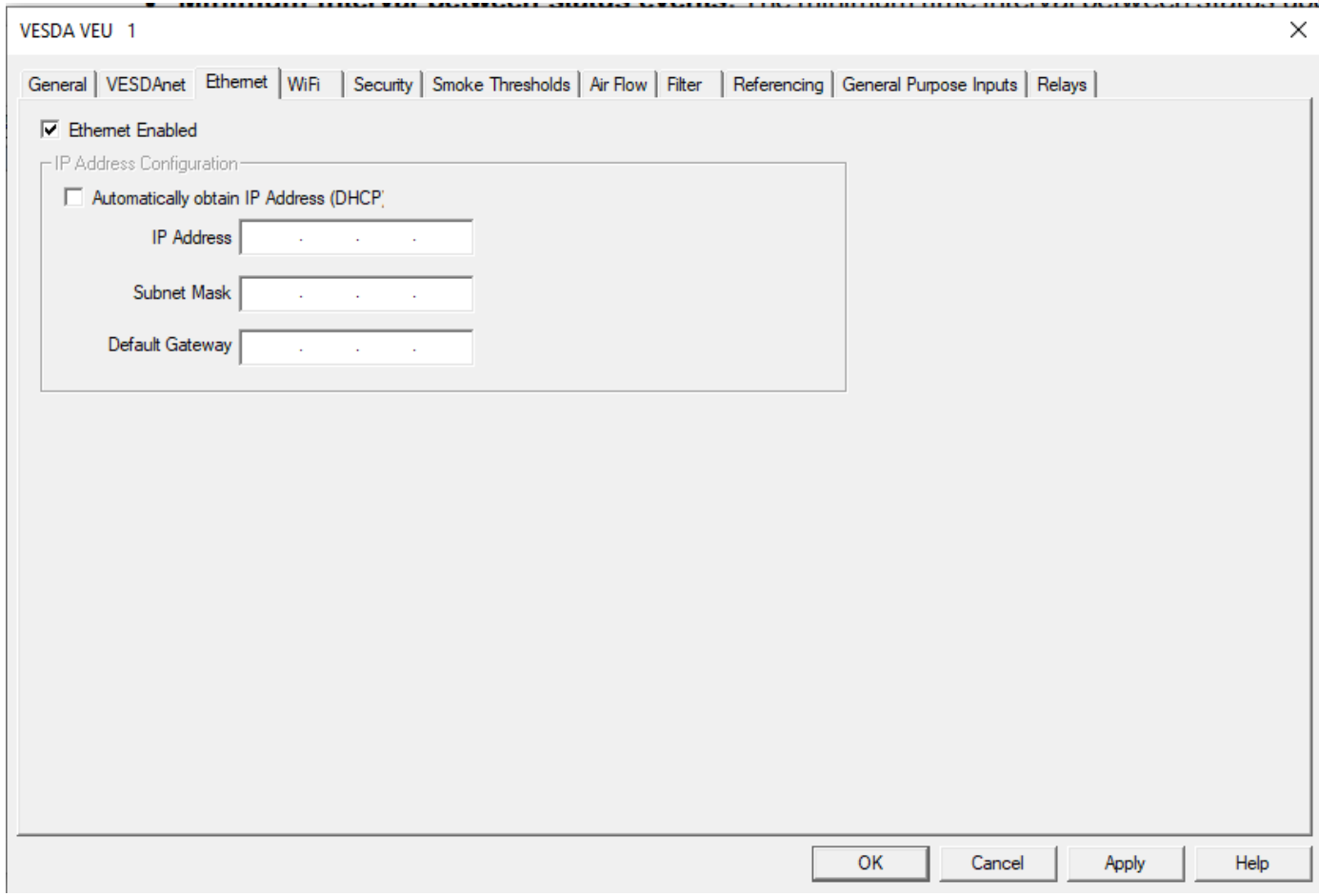


VSC Configuration - Ethernet

The Ethernet options provide the ability to configure the detector to join an existing wired Ethernet network using the normal building network connection process or be directly connected to a PC or laptop.

The Ethernet configuration options are as follows:

- Automatically obtain IP Address.
- Static IP Address Configuration.



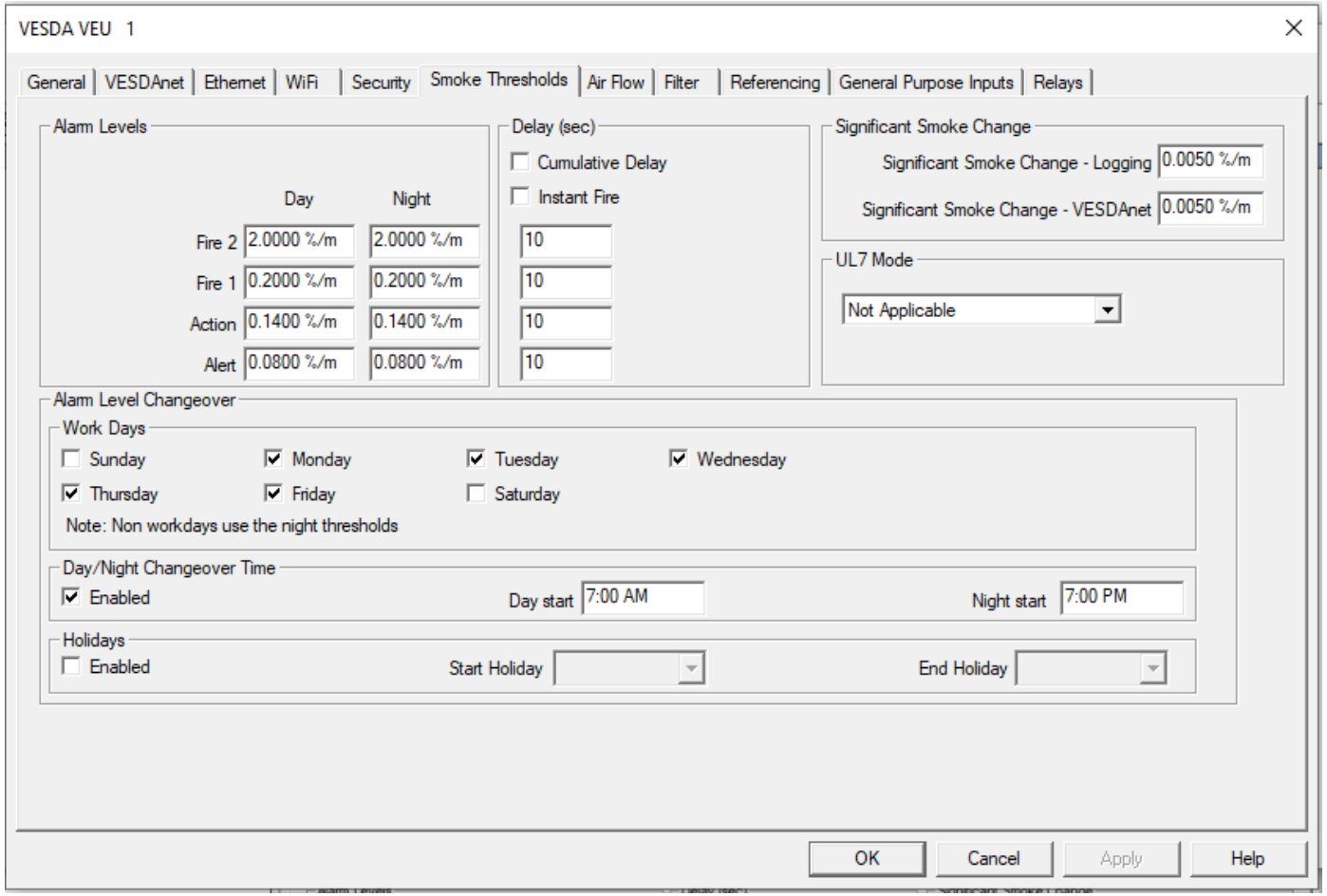
VSC Configuration - Smoke Threshold

The Smoke Threshold options provide the mechanism to set the smoke obscuration trigger point for each alarm level.

The Smoke Threshold configuration options are as follows:

- Day/ Night Thresholds & Delay.
- Significant Smoke Change (Logging & VESDAnet).
- Changeover.

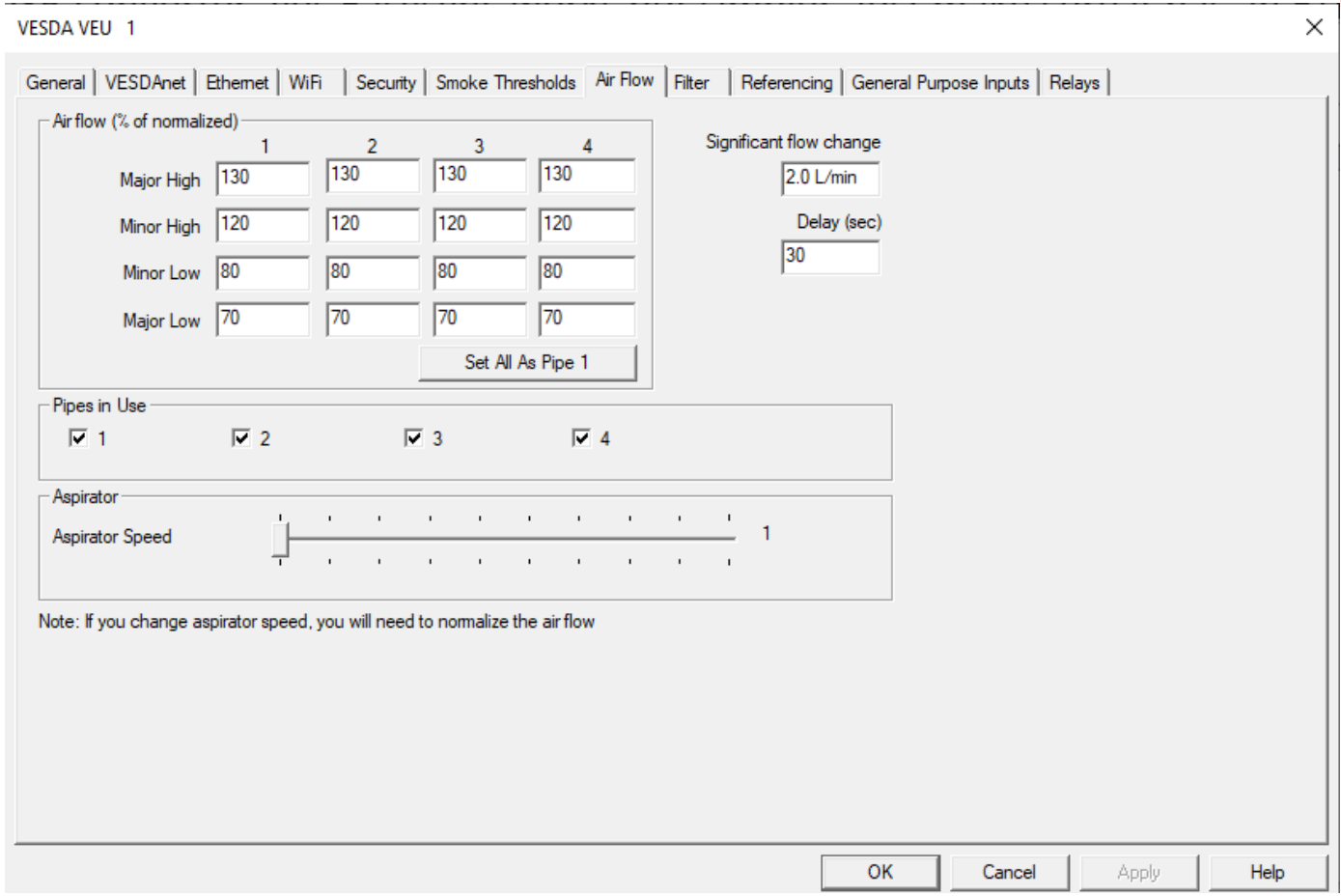
Day and night fire thresholds may be the same



VSC Configuration – Air Flow

The Airflow options provide the ability to set:

- limits for what the detector considers to be normal airflow behavior for the sampling pipe network
- which pipe inlets are being used
- aspirator speed, will be the same as ASPIRE calculations



The Airflow configuration options are as follows:

- Air Flow (Major/ Minor High & Low).
- Significant Flow Change & Delay.
- Pipes in Use.
- Aspirator.

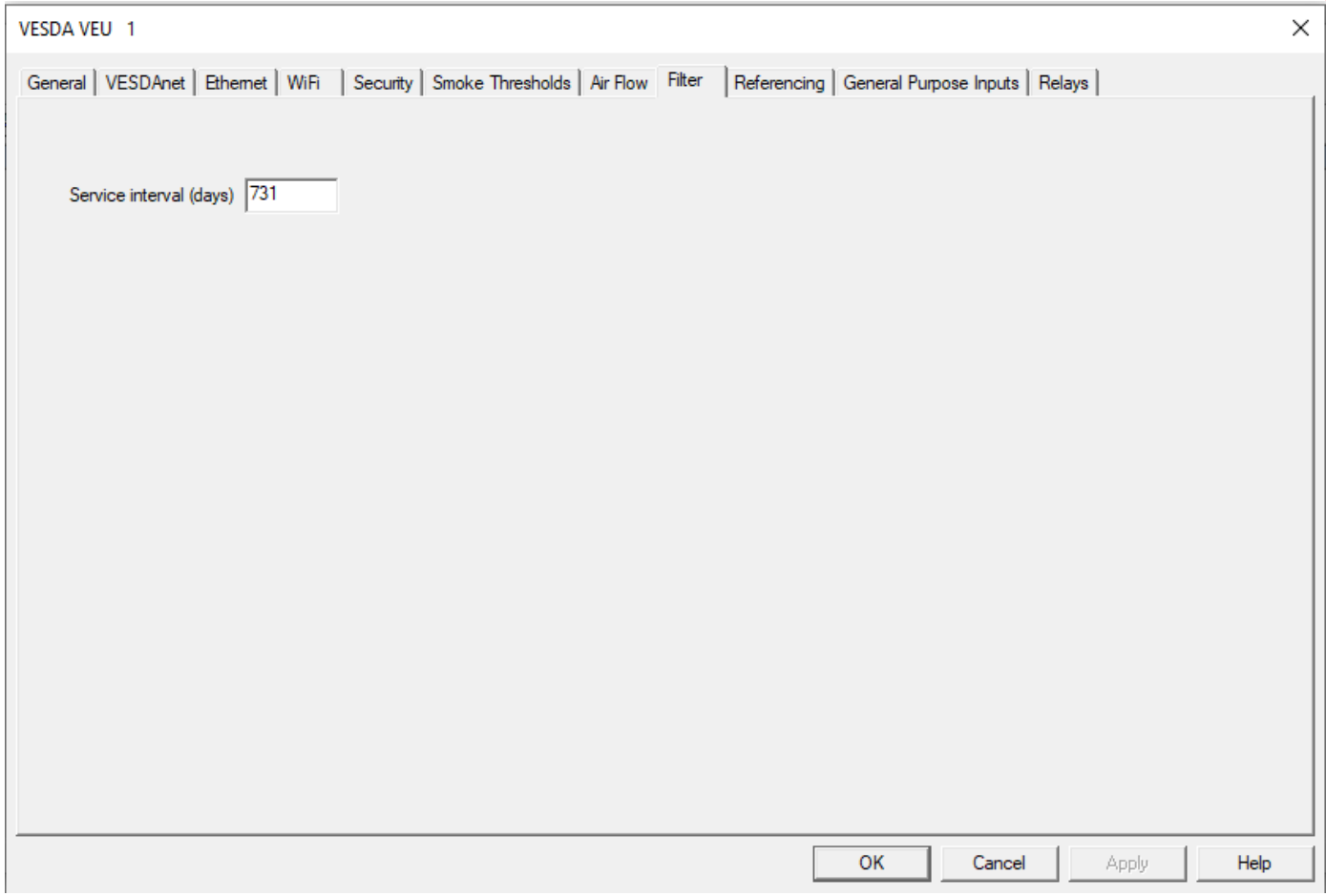
VSC Configuration – Filter

The Filter option page allows you to define the time period after which a filter fault will be generated.

The Filter configuration option is as follows:

- Service Interval (days)

- The filter will give a warning when approaching capacity

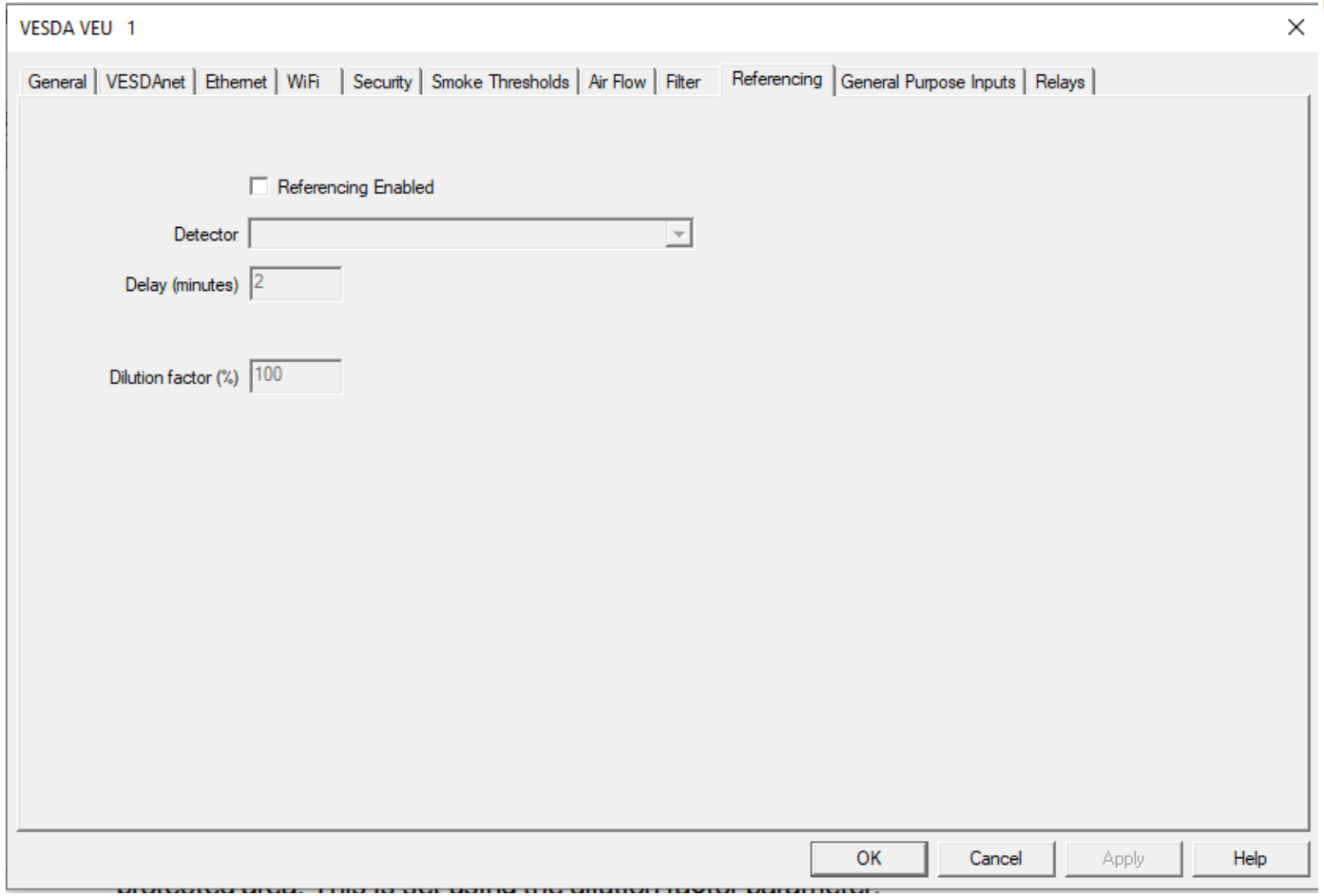


VSC Configuration – Referencing

Referencing is a system design technique employed to compensate for such rises in background smoke levels and therefore reduce nuisance alarms in high sensitivity areas.

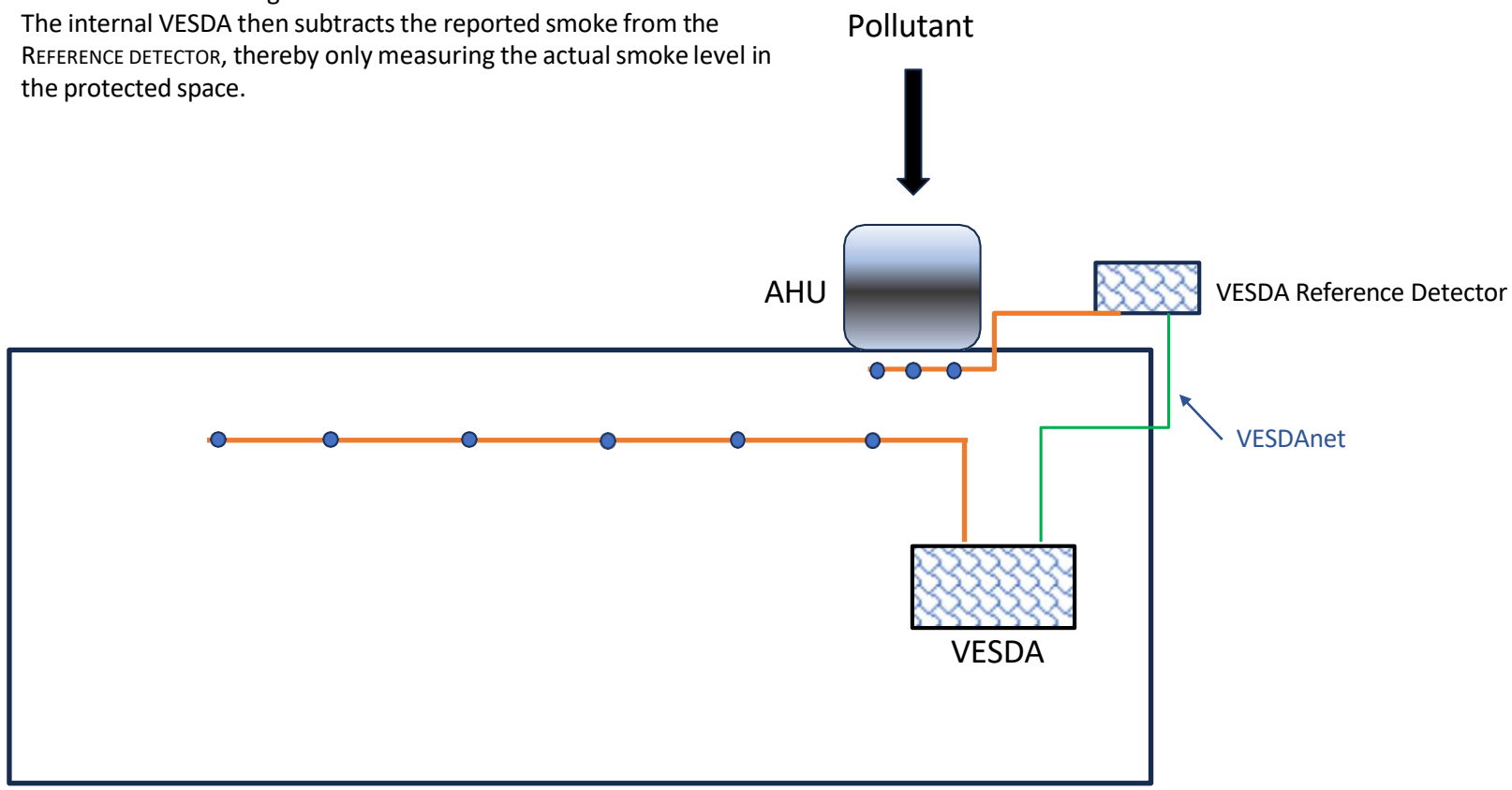
The Referencing configuration options are as follows:

- Referencing Enabled
- Detector
- Delay
- Dilution Factor



VESDA Reference Detector

The concept of a REFERENCE DETECTOR is to measure incoming smoke from the AHU. It then tells the internal VESDA (via VESDAnet) how much smoke it is seeing.
The internal VESDA then subtracts the reported smoke from the REFERENCE DETECTOR, thereby only measuring the actual smoke level in the protected space.



VSC Configuration – General Purpose Inputs

The General Purpose Inputs options page provides the ability to control the behavior of the Unmonitored and Monitored General Purpose Inputs (GPIs).

The GPIs can be configured to initiate a number of different actions.

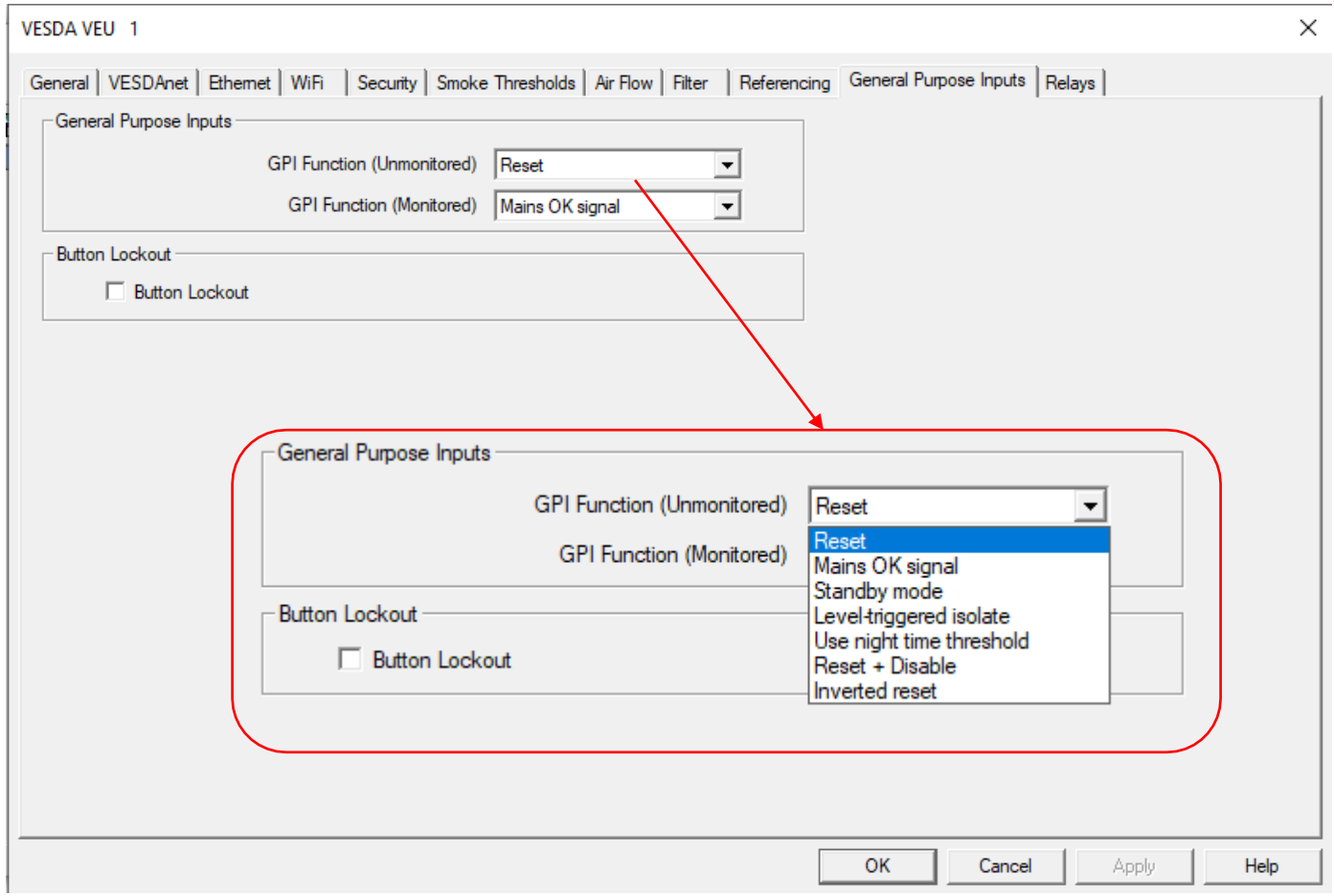
GPI Function:

External Reset, Mains OK, Standby Mode, Disable, Use Night-time Threshold, Reset + Disable & Inverted Reset

The configuration options are as follows:

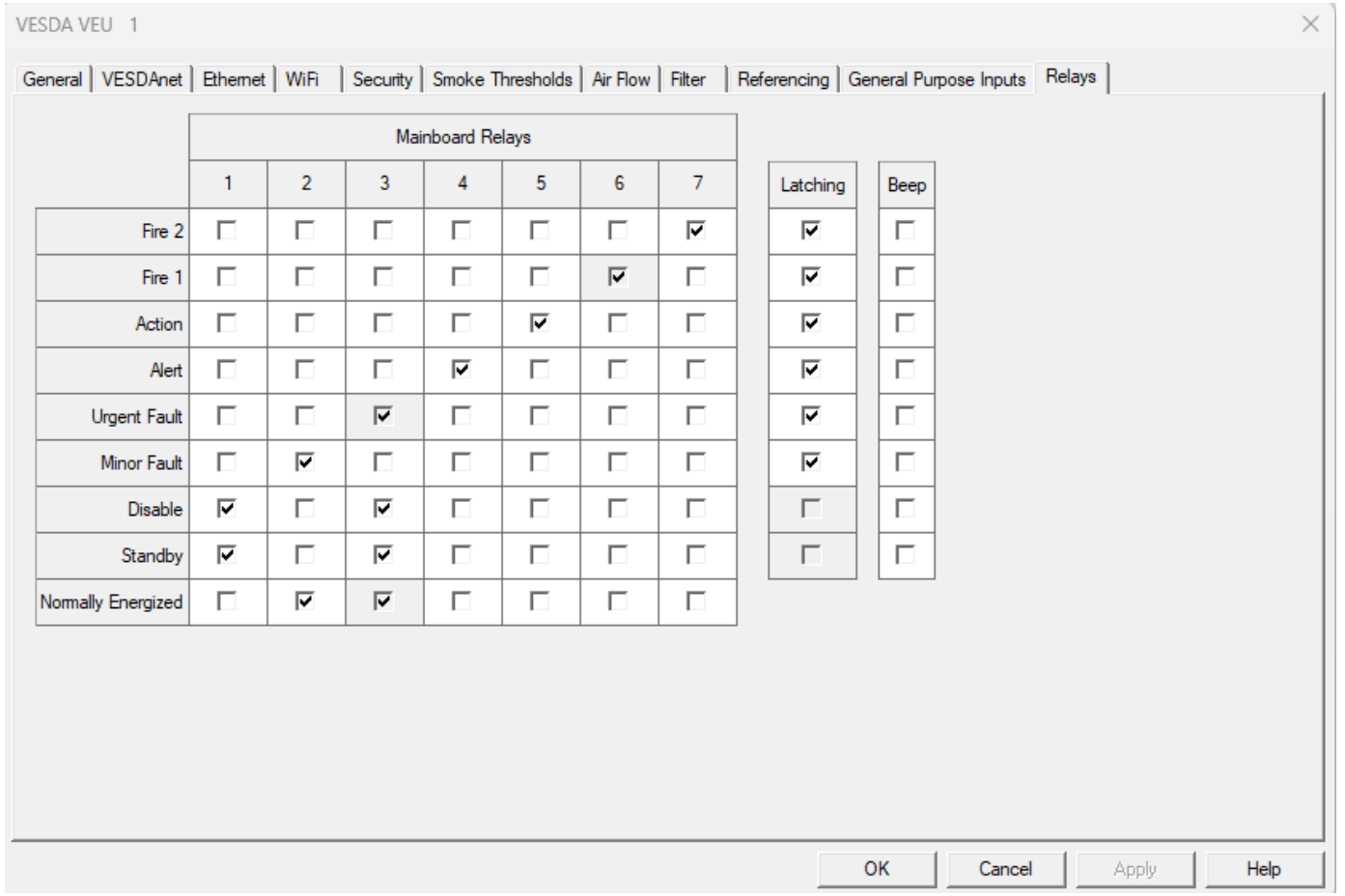
- **GPI function (Unmonitored) and GPI function (Monitored)**
- Button Lockout.

*Note: some VESDA detectors have one GPI only, please refer to Product range Module or VESDA detector Data sheet.



VSC Configuration – Relays

The Relay options page provides the ability to determine which alarm or fault condition is assigned to each relay and whether each condition is latched. In addition, each relay can be configured Normally Energized or Normally De-Energized.



Relay Assignments: Select the conditions you want to assign to each relay by checking the checkbox under the relay.

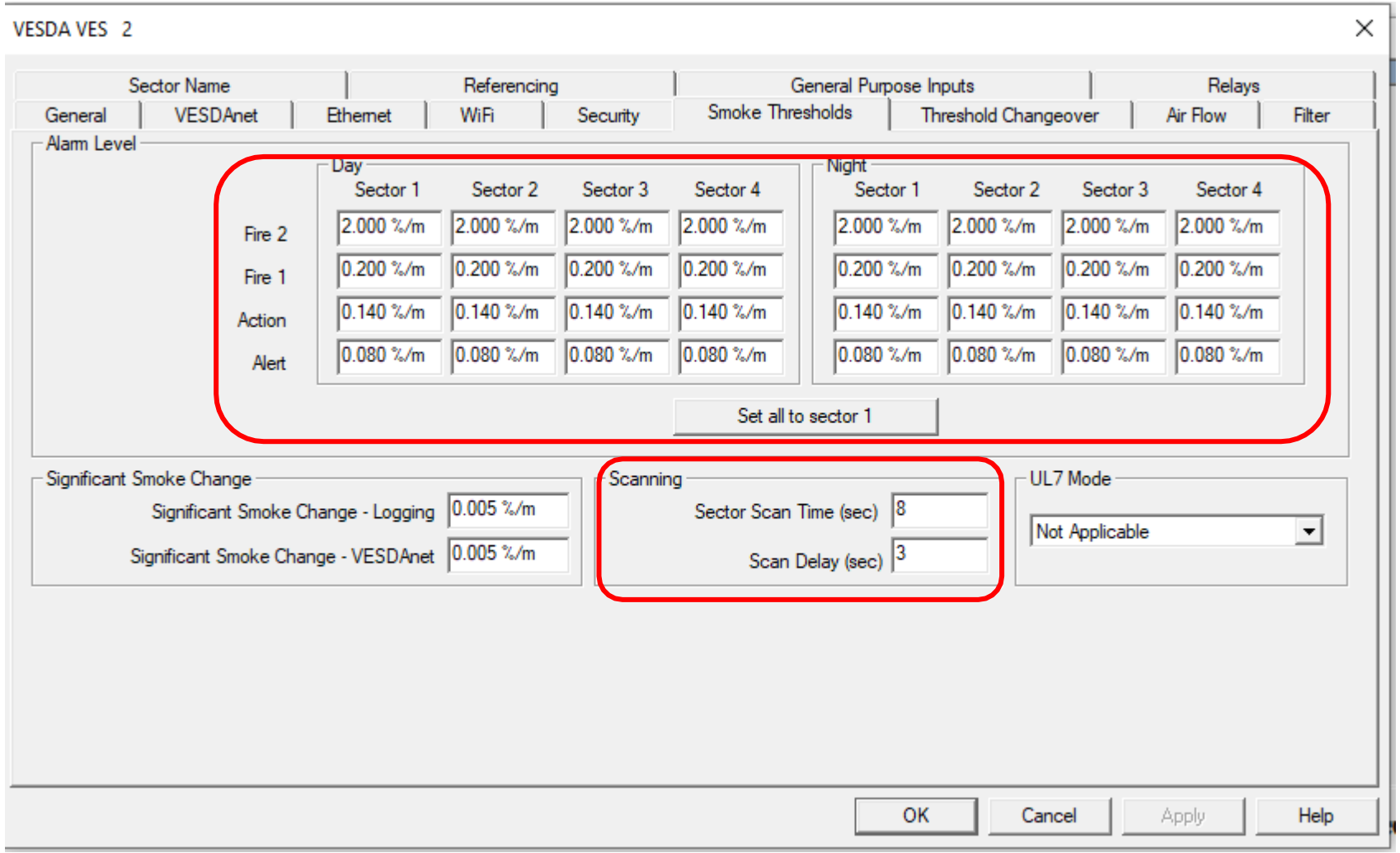
The following checkboxes cannot be changed:

- **Relay 6 always reports Fire 1**
- **Relay 3 always reports Urgent Fault** and is always Normally Energized.

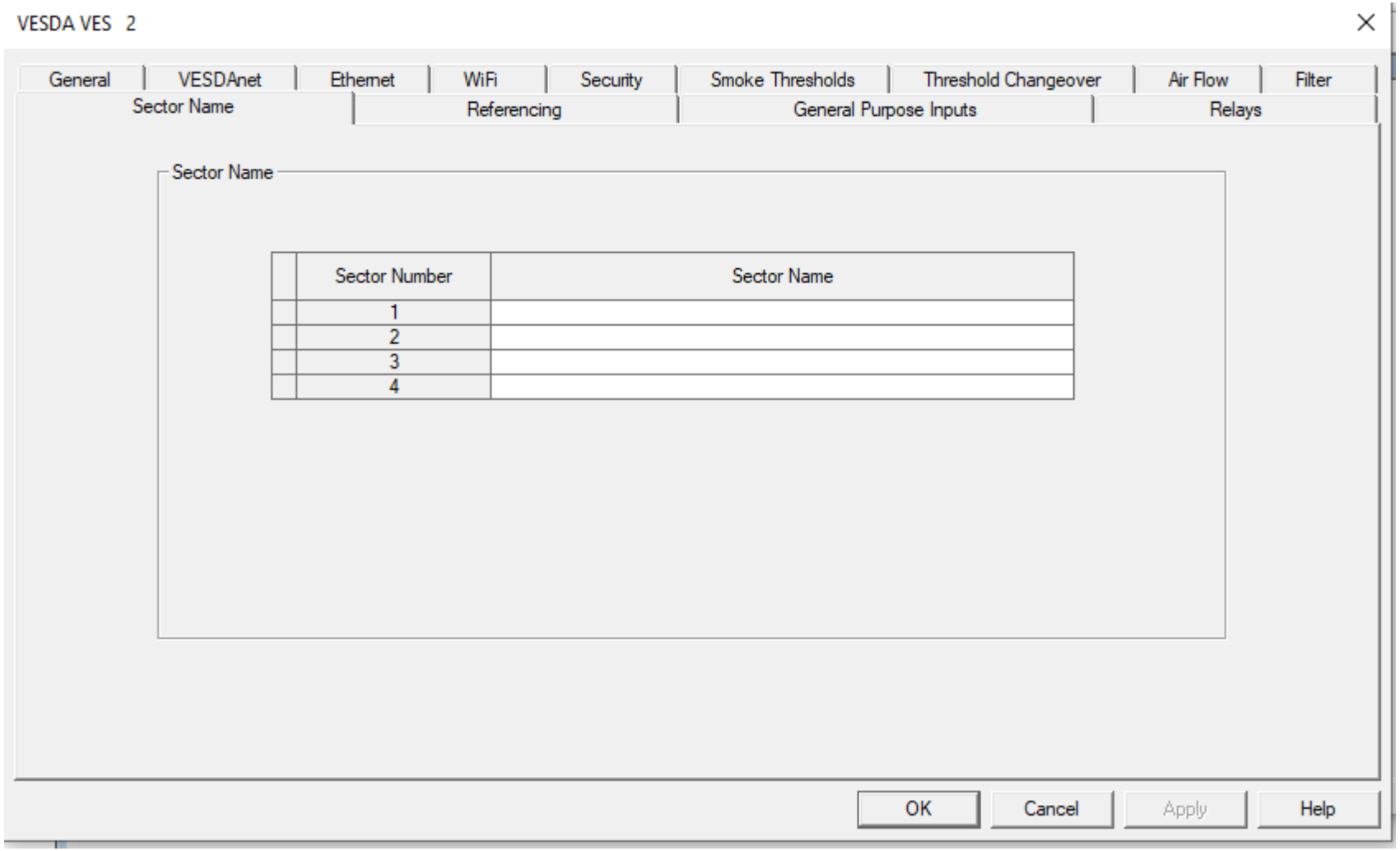
Latching: the detector “remembers” the condition and holds the corresponding relays and displays in the active state.

Beep: buzzer will beep when the condition occurs.

VSC Configuration - Smoke Threshold (VES)



VSC Configuration - Sector Names (VES)



Raw Airflow Data

- Raw Airflow Data is a Data which **does not have a volumetric unit of any kind for old generation**, while it **has a unit (Liters/Minute) for the new detectors** range (VLF, VLI & VESDA-E).

- It is recommended to record the Raw Air Flow at installation. It should then be checked every 6 months.
- Check actual flow is within 10% of the Aspire calculations. If not cross check the actual pipework with the design and the sample holes diameters.

- A decrease in Raw Airflow will be indicative of sampling holes becoming progressively blocked.

- Raw Airflow will show this, whereas the Percentage Airflow may not if the flow has recently been normalized.

Normalize Flow (%) vs. Raw Flow

VESDA Unit #1

Raw Flow = 40 L/Min

After Normalizing the Detector
Air Flow Percentage = 100%

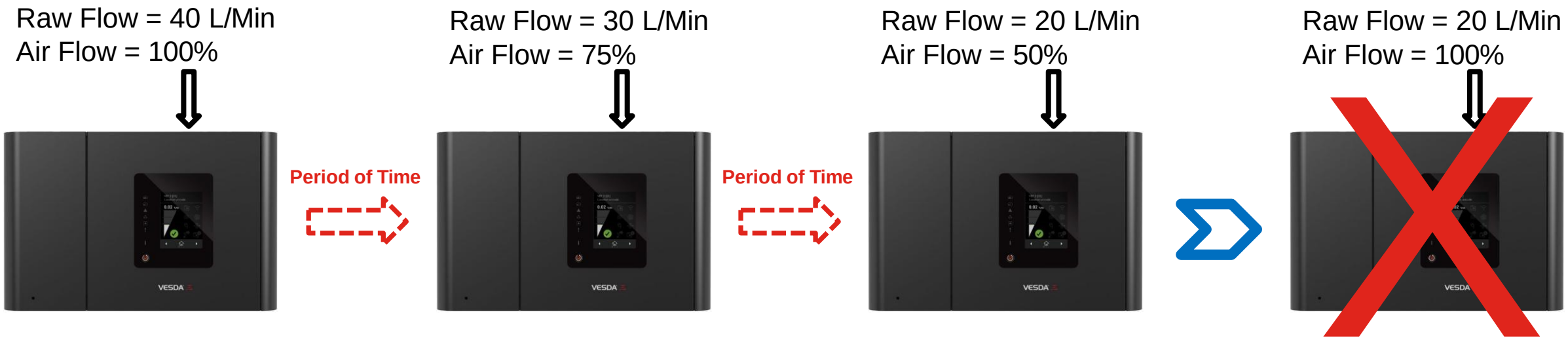
VESDA Unit #2

Raw Flow = 25 L/Min

After Normalizing the Detector
Air Flow Percentage = 100%

Raw Flow vs. Time

VESDA Unit #1



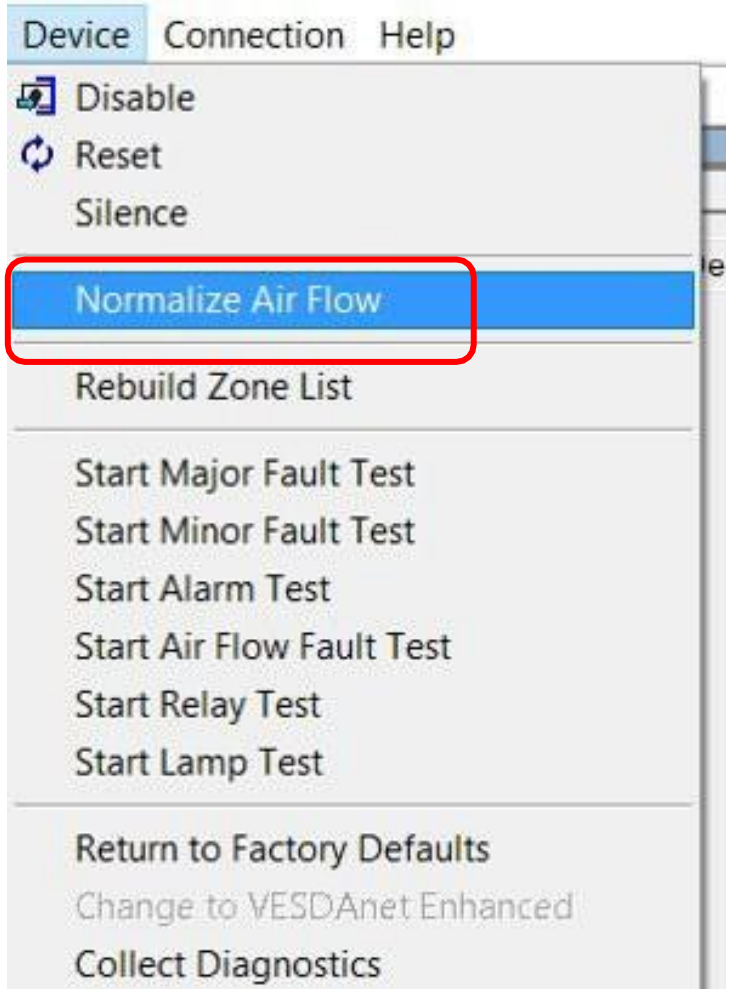
- Holes within time will partially blocked reducing the air flow inside the VESDA unit/ pipe.
- Maintenance will be required to clean the pipe(s)/ holes.
- If system normalized without maintenance, VESDA unit will understand that this is the new base point and set the percentage flow to 100% again! **(WHICH IS NOT THE RIGHT WAY)**

Normalize airflow

The normalization process determines the reference flow rate, The aspirator remains on throughout the normalization process and no fault is reported unless the process fails successfully to complete.

This takes approximately 3 minutes, after which the pipe flow rates (%) should be close to 100%.

then, Reset the detector after normalization. It should be running without faults.



The normalizing status may be observed on the Xtralis VSC software.

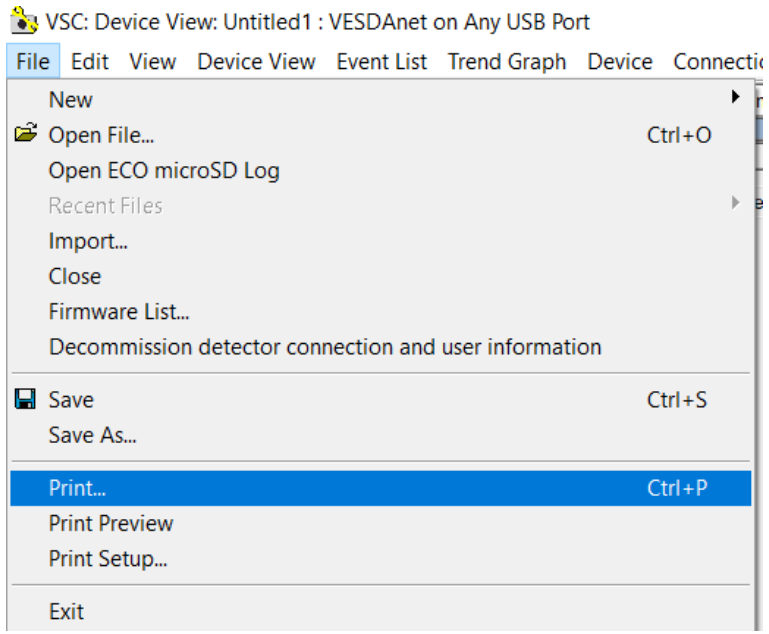
Or,

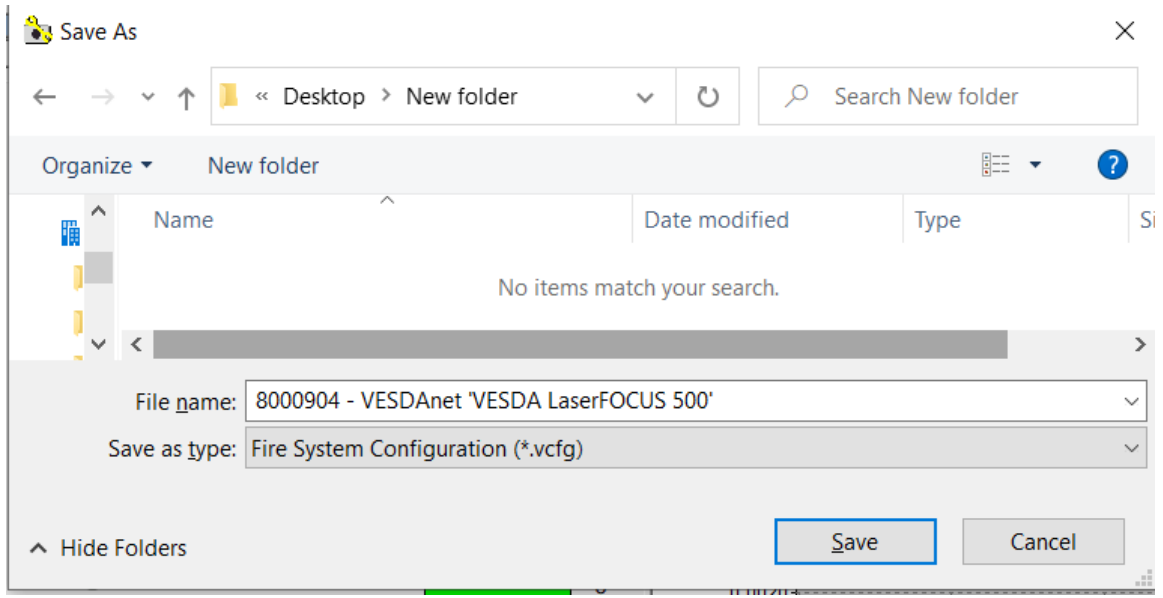
Using internal AutoConfig button:

To normalize the detector, press and hold the button until the AutoConfig LED illuminates continuously (approximately 2 seconds), then release the button.

Print Configurations

- Run “VSC”.
- Select “”Connect and View”.
- From File >> Print (PDF format) Or File >> Save as (VCFG format)

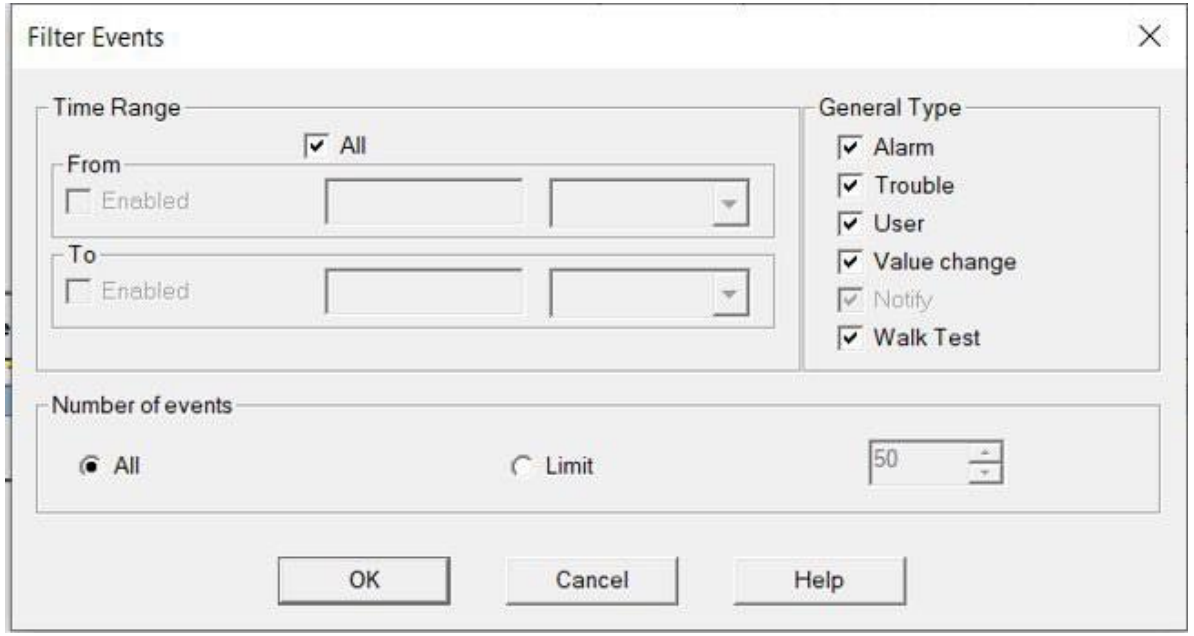




Print Event Log

Event Log:

- Run “VSC”.
- Select “”Connect and View”.
- From View >> Event Log
- Filter Events then Save As: (File Extension is VEVT)



Collect Diagnostics

Collect Diagnostics feature of VSC is to provide a single command to collect diagnostic data from a selected detector. This is to simplify the complex procedures required to obtain support information from end user.

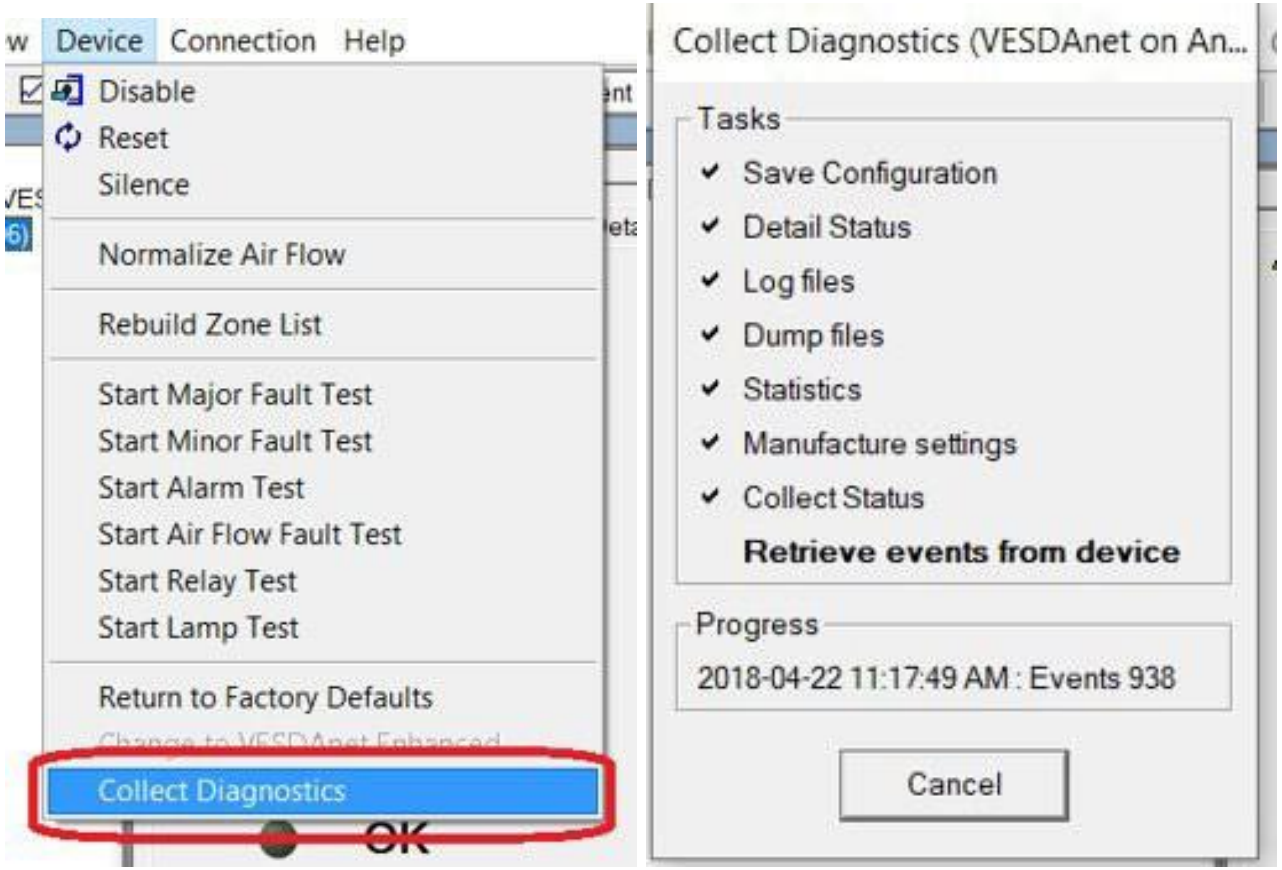
The Diagnostics Pack collect the following data:

- Event log
- Configuration File
- Details Status View
- Maintenance Report - Flow: Smoke Readings, airflow readings, filter life and Service Due Date at the time of collection
- Maintenance Report- thresholds: alarm thresholds
- VSC/VSM log

Collect Diagnostics

How to Collect Diagnostics:

1. Run “VSC”.
2. Select the Detector from the Device Tree. On VSC Main Menu>>Device>>”Collect Diagnostics”.
3. Press OK when the dialog below display.



REFER TO PRODUCT'S GUIDES FOR MORE INFORMATION

Commissioning

3. System Test

- Relay Test (Integration):

  Verifying the validity of connection between detector and FACP or other systems.

- **Pipe Integrity (Smoke Test):**

  Verifying transport time from the furthest hole or a maintenance test point and comparing with the original and all previously recorded results to identify deviations.

- **Performance Test:**

  Measuring the performance of the system based on the given design arrangement and application parameters (ceiling height, classification, air circulation, …etc.).

- Record method and results

System Tests

- Performance Test Types:
  - Smoke Pellet Performance Test
  - Paper Burn Performance Test
  - Overheated PVC/LSF Wire Performance Tests
  - Overheated Resistor Performance Tests
  - Polyurethane Mat Performance Test
  - Potassium Chlorate & Lactose Performance Test

- The decision as to whether performance test should be conducted during commissioning or the type of that test depends on the classification of the ASD system being deployed.

- **Check your local codes for more information about ASD performance smoke testing methods or requirements.**

Smoke Pellet Test

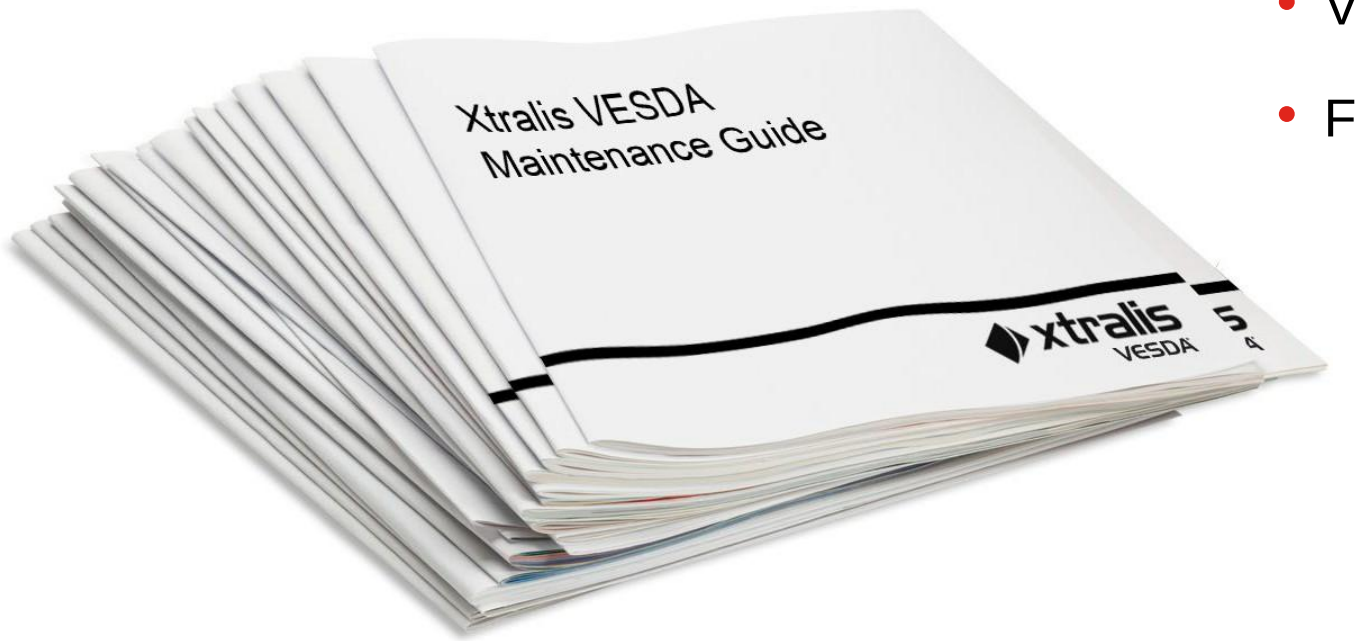
- Chimney *(10cm dia, 15cm high)*
- Plate *(20cm square 2mm thick)*
- Pellet *(under chimney) (13g)*
- Gas Burner *(5.8kW thermal output)*

Please refer to commission guide and local resources for actual test steps (FIA CoP as an example for Europe region)

Real Testing

- In some applications, it is a requirement to conduct real type testing as a way of verifying the system.
- This could be by burning goods or packaging that is stored.
- Obviously this is not possible in some cases
- Each application should be viewed independently
- Materials used in the smoke test should be representative of the actual fuel load in the environment

Troubleshooting & Maintenance – Main References



- VESDA Troubleshooting Guide
- VESDA Maintenance Guide
- VSC Help
- Front Panel Display

VESDA VLF Troubleshooting with Instant Fault Finder

- When a fault is registered on the detector, the fault light remains on for Major Fault situations and flashes for Minor Fault.
- The Instant Fault Finder function is operated by pressing the Reset and Disable buttons together.
- The Instant Fault Finder function aids rapid diagnosis of faults:

Fault	Type
1	Filter
2	Aspirator
3	High flow
4	Low flow
5	Not in use
6	External Device / Power Supply Unit
7	Interface card
8	Field wiring
9	AutoLearn fail
10	Detector failure

Maintenance

Minimum recommended always consult local codes and standards

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

Standby

- When maintenance is performed on the pipe network or sample points it is recommended that you temporarily set the detector to Standby in order to turn off the aspirator.
- Setting VESDA detector to Standby mode deactivates the aspirator and stops all detection of alarms.
- To set the detector to Standby mode using Xtralis VSC, select Go to Standby from the Device menu.
- To re-activate the unit, select End Standby from the Device menu.

Commissioning

4. Hand-Over

- Complete Commissioning Form and attachments
- Forward documents to relevant people
- Always keep all copies of full commissioning documents.

Firmware Upgrade

Firmware Upgrade

- The firmware upgrade of the detector is done using a USB flash drive.

Equipment

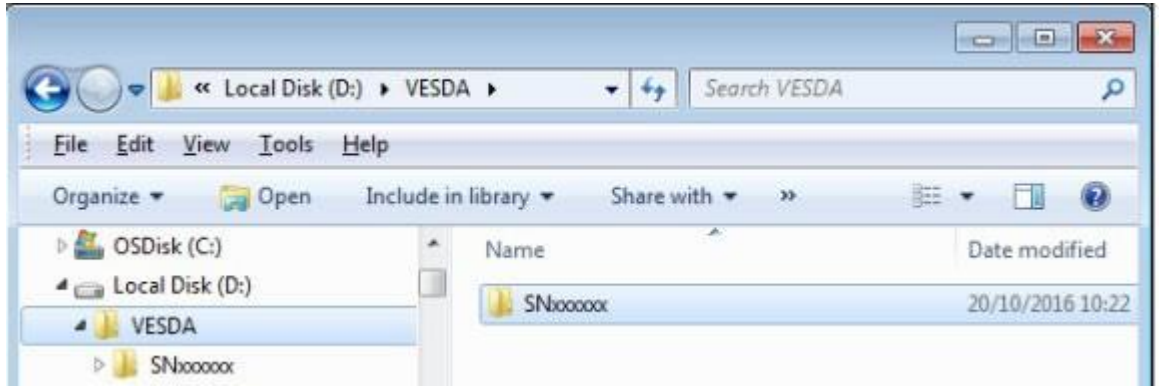
Before you start you will need the following items:

1. A computer with latest VSC version, you can download it from www.Xtralis.com
2. USB extension cable type A (male) to type B (male). Use this to connect your computer to the VESDA-E detector.
3. USB converter type A (female) to type B (male).
4. USB Flash drive USB-2.0 – Must be FAT32 file format.
5. Firmware upgrade files (ensure that the upgrade package is genuine and obtained directly from Xtralis.

Firmware Upgrade

Prepare the USB Flash Drive

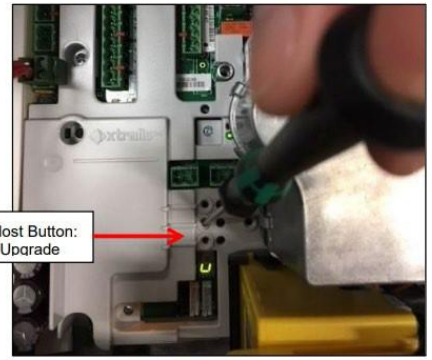
1. Copy the firmware upgrade file to the flash drive's top-level folder.
2. Extract the contents of the .zip to the top folder of the flash drive. You should see the VESDA folder in the top folder of the flash drive.
3. Go into the VESDA folder and you will see a folder named SNxxxxxx. Change the characters xxxxxx to the serial number of the detector. The serial number is printed on the detector's approvals label inside the door and is also displayed on the Version Info screen of VSC.
4. USB Flash Drive Preparation Completed.

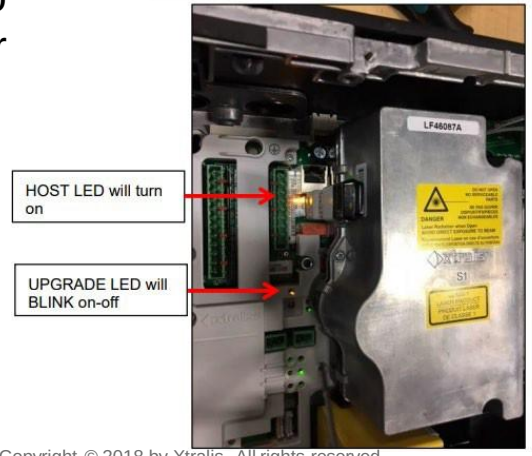


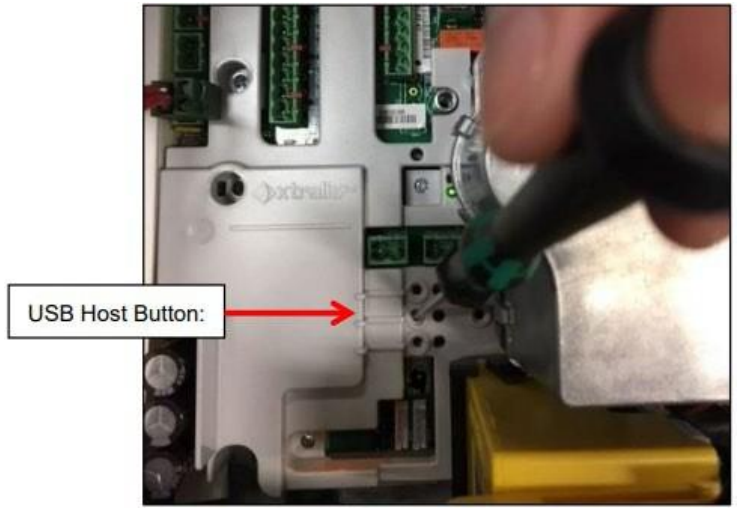
Firmware Upgrade

Perform Upgrade

1. Insert the USB flash drive into the USB converter and plug the converter into the detector's USB socket.
2. Press the upgrade button for 10 seconds or until the USB HOST LED turns on. The 7-segment display will show a 'u' while the button is pressed.
3. Wait until UPGRADE LED stops blinking and stays fixed ON.
4. Press upgrade button until UPGRADE LED turns OFF.
5. Wait another 60 seconds for the WiFi upgrade to execute. This will happen in the background after the detector re-boots.
6. Remove Flash Drive



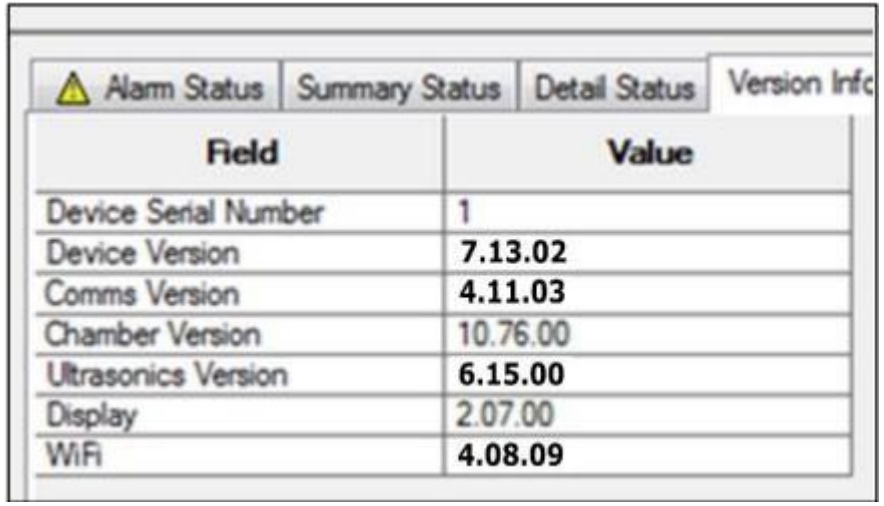


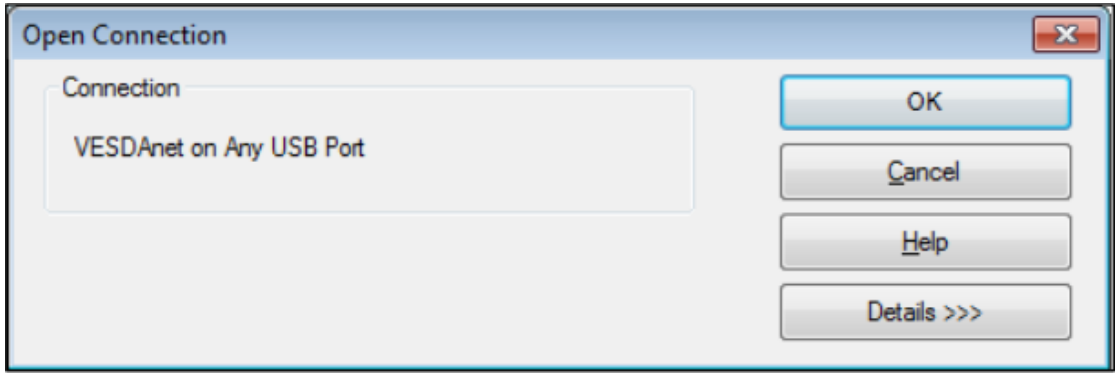


Firmware Upgrade

Verify

1. Connect the computer to the detector using the USB cable.
2. Run VSC on the computer and from the menu click Connect and View.
3. Open a new USB connection and click OK.
4. On the main screen, select the tab labelled Version Info. (See example).

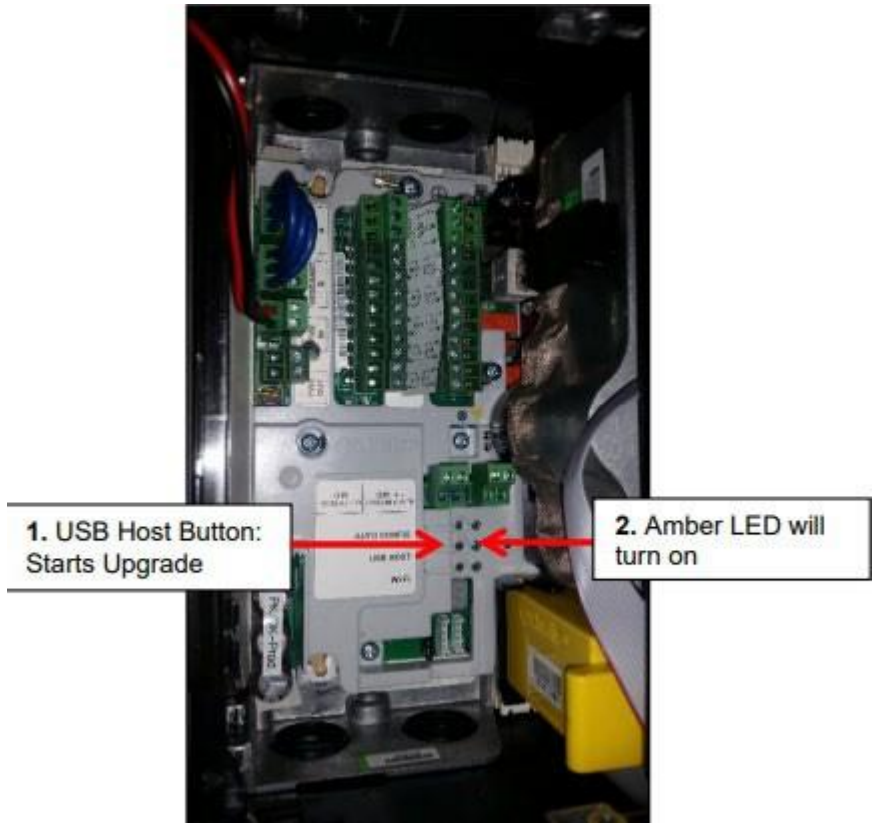




Firmware Upgrade

Troubleshooting

Here are the symptoms that indicate an update was not successful and the action to perform in each case.



Error Code	What it means	How to fix it
1, 2, 3, 4	Unable to access USB key	Use a different USB drive
5, 6	Unable to locate upgrade files in expected directory	Unzip again and ensure directory structure is correct. [VESDA at top]
7	Upgrade file(s) invalid	Unzip again and repeat, if problem persists then contact Customer Support
8, 9, 14	Unable to update log file on USB key	Check and correct if USB key is write protected or full
10	Failed to perform upgrade	Repeat the upgrade process, if teh upgrade still does not work correctly, send Xtralis customer support the .alog file found in the foldeer \VESDA\SNxxxxxx\Bin
12, 13	Device type error Obtain upgrade file for the correct detector model.	How to fix it

Summary of the Amber upgrade status LED behaviour. (LED 3)

Amber Upgrade Status LED behaviour	Meaning
Off	Detector Ready for Upgrade
Flashing once per second	During upgrade

Summary

Commissioning, Testing, and Maintenance

- Preparing commissioning documents
- Creating valid connection with all requirements (hardware & software)
- Configuration parameters (zone, smoke & flow thresholds, networking, …)
- Testing steps (relay test, simulating smoke, pipe integrity test and performance test types when required)
- Documentation
- Common maintenance actions can be referred to VSC help and product guides
- Firmware Upgrade