

**Stratos**<sup>®</sup> 

**EX**<sup>™</sup>



***Hazardous area aspirating smoke detector***

*Installer's Handbook LM80029 • Issue 2*





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## Introduction

*Stratos-Ex*<sup>™</sup> is a highly sophisticated 'next generation' of High Sensitivity Aspirating Smoke Detection product that has been designed to ensure that installation and commissioning is as simple as possible, whilst optimising performance.

Stratos-Ex incorporates a patented system of 'Perceptive Artificial Intelligence' known as ClassiFire<sup>®</sup>, which allows the detector to initially configure and then to maintain itself at optimum sensitivity. ClassiFire also monitors the detector chamber and dust separator for contamination, continually adjusting the appropriate operating parameters to counteract the negative effects of such contamination.

The Stratos<sup>®</sup> range of detectors are unique in being able to provide a consistent level of protection in a very wide range of environments by continuously making minor adjustments to sensitivity. Detectors from this range have proven their worth many times by detecting 'difficult-to-detect' slow-growth electrical overload incipient fires in 'difficult' environments.

This handbook gives information likely to be needed for most installations, but for more detailed information on subjects such as Fresh Air Referencing, please refer to the complete Technical Manual or System Design Guide.

This equipment is Class III as defined in EN60950 (i.e., this equipment is designed to operate from Safety Extra Low Voltages and does not generate any hazardous voltages).

### Key features:

- Suitable for use with gas groups A, B and Hydrogen.
- Light weight for easy and safe installation.
- External filter for maintenance without opening flameproof enclosure

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If this equipment is part of a fire detection system, it should be supplied from an approved power supply conforming to EN54-4.

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This symbol appears on the main board of the unit and indicates that the board contains static sensitive components. Suitable anti-static precautions must be taken when handling this component.

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This label is located on the laser chamber and signifies that the unit is a Class 1 Laser product as specified in IEC 60825-1. The unit incorporates a Class 3B embedded laser which must not be removed from the detector as retinal damage may result if the laser beam enters the eye.

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This symbol indicates the Safety Earth stud. It should not be connected to 0V or signal earth.

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*AirSense Technology has taken every care to ensure that Stratos-Ex is as simple to install as possible but in case of difficulty, please contact our **Help Line** to ensure trouble free installation and operation.*

*AirSense Technology takes no responsibility for damage or injury occasioned as a result of failing to install or operate and maintain the equipment in accordance with these instructions.*

**HELP LINE**  
(+44) (0) 1438 751296

Stratos-Ex is housed in a Groveley Engineering flameproof enclosure (certificate No. DEMKO028TEX131598) which is fitted with Knitmesh breathing devices (certificate No. EPSILON06ATEX2138U) at the sample inlet and exhaust ports. The detector features dual high pressure aspirators to overcome the flow restriction of the Knitmesh breathing devices and provide excellent air sampling performance. The use of two aspirators provides an element of redundancy as the system will continue to sample in the unlikely event of an aspirator failure.

For ease of maintenance the air filter is mounted external to the main detector in a separate stainless steel enclosure. The filter housing does not contain any electrical equipment and so it can be opened for filter replacement without compromising the flame-proof protection of the system.

The light weight of Stratos-Ex (8.5kg) makes installation a simple and safe one-man operation, with no special lifting equipment required.

The networking capabilities of Stratos-Ex permit the use of remote displays and other standard accessories. Programming of a Stratos-Ex system can be undertaken using the SenseNET system located in a safe area. As a member of the Stratos family of detectors, Stratos-Ex is fully compatible with the Airsense SenseNet supervisory software package.

Stratos-Ex is ATEX approved and is rated at EEx d IIB + H<sub>2</sub> T3 (Tamb -20C to +45C) or T2 (Tamb -20C to +60C).

The explanation of this rating is as follows:

- E** Carries a certificate in accordance with European harmonised standards
- Ex** Explosion-proof electrical equipment
- d** Protected by a flame-proof enclosure
- II** Equipment class II (For surface industries)
- B** Gas group B
- + H<sub>2</sub>** Hydrogen gas
- T3** External surface temperature will never exceed 200°C. See note above.

This approval rating means that the system can be used in an area where an explosive mixture is likely to occur in normal operation (Zone 1) and where the gas which is causing the risk is from gas group A, gas group B or is Hydrogen.

**Explosion-proof housing** - Ex II 2 G EEx d IIB+H<sub>2</sub> T3 (Tamb -20°C to 45°C)  
Ex II 2 G EEx d IIB+H<sub>2</sub> T2 (Tamb -20°C to 60°C)

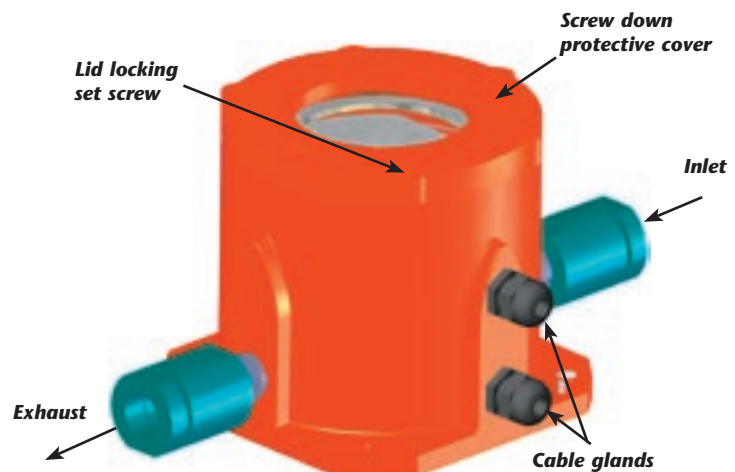
## 1. Indicators



1. Fire indicator illuminates when the alarm level has been reached and the appropriate time delays have expired.
2. Fault illuminates when the unit has a fault and a fault signal is being sent to the fire alarm panel or connected monitoring equipment.
3. OK illuminates to show normal operation when there are no faults. The OK lamp will flash during the 15 minute FastLearn™ period when the detector is first learning its environment.

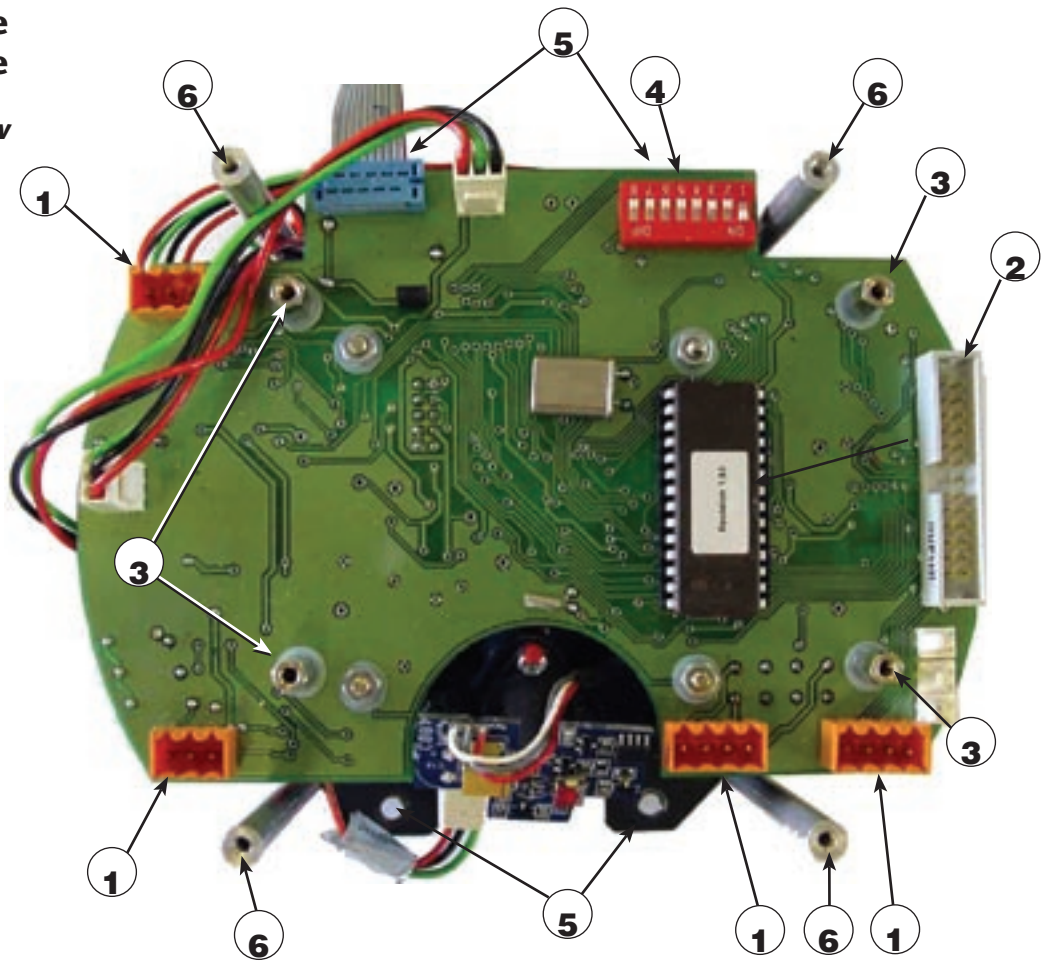


**Important Note:**  
Removal of the screw down cover in most applications where this product is installed will require a Hot Work permit.



## 2. Inside the Enclosure

### 2.01 Interior view



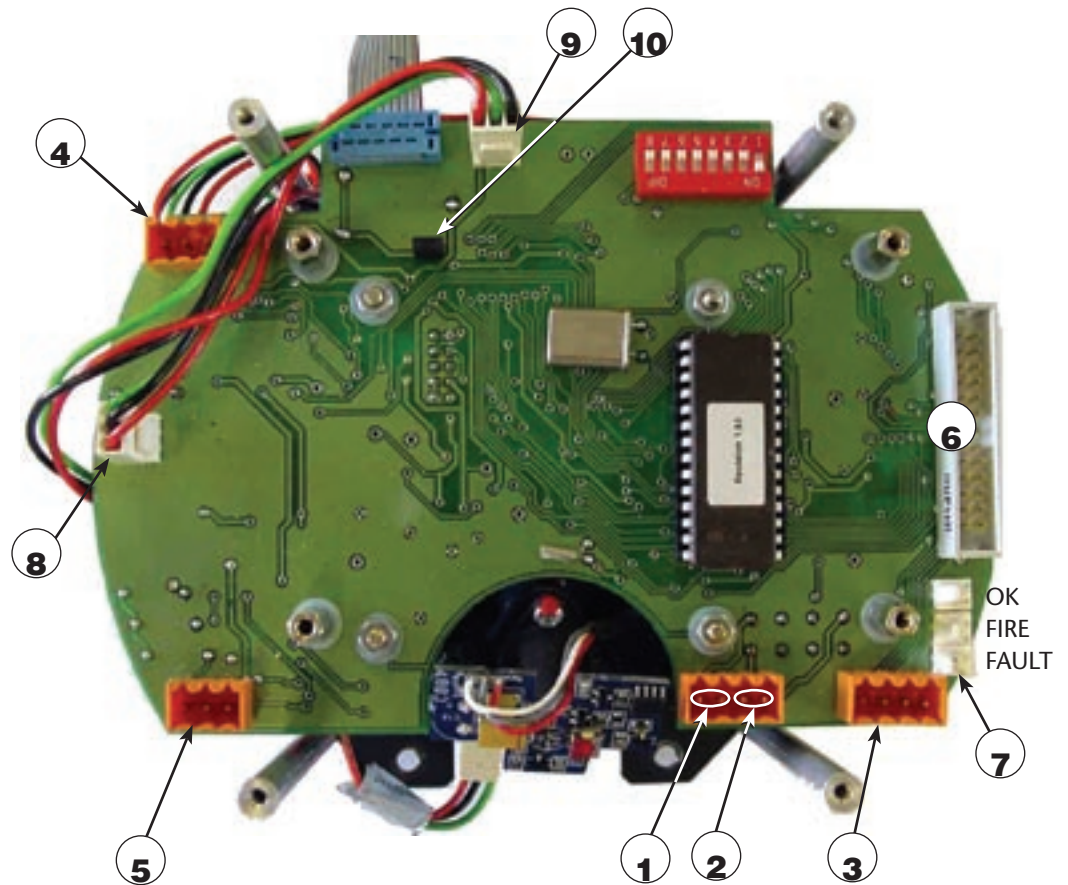
### **Detector Assembly Removal**

The display must first be removed (See section 1) in order to gain access to the four detector assembly retaining screws (5). When the four retaining screws are removed the assembly may be withdrawn from the enclosure as shown above.

If the detector assembly needs to be removed, care must be taken to avoid damaging the airflow sensor cable. This must be disconnected from its connector adjacent to the detector address switch before the detector assembly can be withdrawn.

1. Removable terminal blocks (See section 2.02)
2. Addressable Programmable Interface Card (APIC) connector (See section 7.3)
3. APIC securing pillars
4. Detector address switch (See section 7.01)
5. Detector assembly securing points x 4
6. Display plate mounting pillar x 4

## 2.02 Detector connections



### ***Detector terminal connections***

1. Normally closed FAULT relay contact
2. Normally open FIRE relay contacts
3. Loop data to fire panel (See section 6.02.2 & 7.03)
4. RS485 / SenseNET connections (See section 6.02.2 & 7.02.1)
5. Power Supply (See section 6.02.1)
6. IDC 26 way connector for APIC card (See section 7.03)

### ***Internal Connections***

7. Fire, Fault and OK display LED connections
8. Aspirator drive connection
9. Flow sensor connection
10. RAM backup power jumper link

### 3. Programming the Detector

Stratos-Ex may be programmed from a PC when connected to the detector via a standard 9-pin "null modem" (serial) lead connected to the serial port of the computer and the 9 way socket at the top of the front panel display. In order to do this, it is necessary to install the remote control software onto the computer. A copy of the remote control software is contained on a CD supplied with each detector. Install the software in accordance with the on-screen instructions.

In instances where it is not permitted to energise the detector with the screw-on cover removed, it is possible to program the detector remotely via a Command Module.

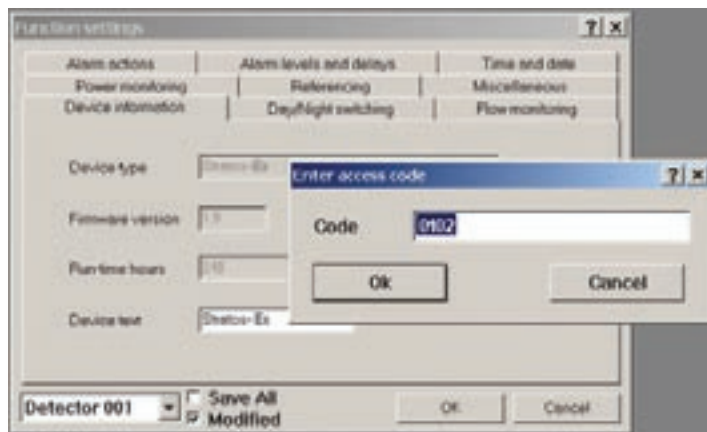


*Important Note: Removal of the screw down cover in most applications where this product is installed will require a Hot Work permit. Removal of the screw down protective cover will affect the airflow monitoring.*

The programmable functions are all accessed through the "Options □ Detector settings" sub-menu or by clicking on the detector symbol in the remote software toolbar as indicated below.



**NB** □ Initially there will be a prompt to enter the access code, whose default setting is '0102'.



This window contains all the programmable functions for Stratos-Ex.

To change one of the programmable functions, go to the relevant tab in the "Function settings" window, make the change and then click "OK". This will save the change to the detector's internal memory.

A list and explanation of the various functions is given overleaf, with the functions grouped by the tab under which they appear.

### **3.01 Time and date - Time and Date tab**

It is important that the time and date be set up correctly on the detector's internal calendar/clock because it uses this information to store events in the event log. (See section 8), "Event log" for more details. Unless specially ordered, units are supplied with the correct setting for UK time, and the clock is backed up with a rechargeable battery. Later adjustments to the clock setting should not exceed  $\pm 70$  minutes unless a FastLearn is initiated (See section 3.07), otherwise the day-night switching may not function correctly. (See section 3.11).

### **3.02 Alarm levels - Alarm levels and delays tab, Level subgroup**

The value set in the **Fire**, **Pre-Alarm** and **Aux** functions in the **Level** subgroup is the relatively scaled bargraph level at which the appropriate alarm is initiated on the detector. The **Fire 2** level assigns an absolutely scaled alarm level in percentage obscuration per metre.

The **Aux** level is set by factory default at level 10 which means that this alarm will occur after the **Fire** alarm. The default level settings for **Pre-Alarm** and **Fire 1** are 6 and 8 respectively. The default setting for **Fire 2** is 20% obs/m.

*Note: That the Stratos-Ex has four alarm levels and a bargraph that are used internally and transmitted via the SenseNET system. One alarm level and fault relays are provided on the standard Stratos-Ex. If more outputs are required then accessories are available to provide them.*

### **3.03 Alarm delays - Alarm levels and delays tab, Delay subgroup**

The alarm delay is the number of seconds that an alarm level has to be continuously maintained before the alarm is initiated. Each alarm level has a programmable delay of between 0 and 90 seconds. The default delay for each alarm level is 5 seconds.

### **3.04 ClassiFire override - Alarm levels and delays tab**

*This function is only available if the detector is fitted with an optional card which provides inputs. When this function is set to a value other than zero, the shorting together of the Input 2 contacts on the option card will desensitise the detector by the specified percentage.*

### **3.05 ClassiFire Alarm factor - Alarm levels and delays tab**

The detector sensitivity is set with this function, which will also affect the probability of nuisance alarms. 0 = high sensitivity, higher probability, 8 = low sensitivity, lower probability. The default alarm factor is 4.

*Note: The highest sensitivity setting (0) is suitable for clean, environmentally controlled areas where airborne pollutants are kept to an absolute minimum and the least smoke density is desired to cause an alarm.*

*Use of this setting in a smoky environment could lead to relatively frequent nuisance alarms due to the high level of normal variation of atmospheric smoke density. It is therefore important that the ClassiFire Alarm Factor chosen is suitable for the area to be protected. When the appropriate alarm factor for the protected area has been set, nuisance alarms will be maintained at an absolute minimum with no need for detailed setup.*

The following table gives suggested settings of ClassiFire alarm setting.

Alarm Factor	Sensitivity	Probability of Nuisance Alarm
0	Extremely High	Once per year
1	Very High	Once per 5 years
2	High	Once per 10 years
3	High	Once per 50 years
4	Medium	Once per 1000 years
5	Medium	Once per 5,000 years
6	Medium	Once per 10,000 years
7	Low	Once per 20,000 years
8	Low	Once per 100,000 years

### 3.06 LDD Enable - Alarm levels and delays tab

When this function is ticked, Laser Dust Discrimination (LDD™) increases the response time of the detector slightly, whilst greatly reducing the likelihood of nuisance alarms due to dust ingress. LDD may be disabled in **very clean rooms** for a slightly faster response to smoke by setting this function to unticking the box. This function is enabled by default. **NB: Disabling LDD is not recommended for areas other than very clean environments, due to the increased probability of nuisance alarms in most other operating environments.**

### 3.07 FastLearn enable - Alarm levels and delays tab

If the detector is in FastLearn mode, unticking this box will stop the FastLearn process. **Using the function in this way is neither recommended nor supported by AirSense Technology.**

Ticking the box will start a FastLearn at any time. The green “OK” LED on the front of the detector will flash for the 15 minutes that it takes for the FastLearn process to finish, and will then change to constant illumination to indicate that the FastLearn is complete.

**Important Note:** It will take a full 24 hours after the FastLearn for full sensitivity to be reached, unless Demonstration Mode has been initiated (See section 3.10, “Demo mode”). It is essential for proper sensitivity setting that the detector not be left in Demonstration mode, and that it be allowed to complete the full 24-hour learning period. To cancel Demo mode, tick this box or power down and restart the detector to initiate FastLearn mode.



### 3.08 Auto FastLearn enable - Alarm levels and delays tab

When enabled, this function ensures that if the detector is powered off for any reason (e.g. for maintenance or to be moved to a new area), a FastLearn is commenced automatically on power-up. There may be occasions when it is desirable to power down the detector for short periods of time, and it is unlikely that ambient pollution levels will be changed upon power-up. Under these circumstances it may not be desirable that the detector should go through a full 24 hour learning period. To this end, this function can be unticked before power-down, whereupon it will return to the original settings on power-up. This function is enabled by default.

### 3.09 **ClassiFire 3D - Alarm levels and delays tab**

If this function is ticked, then the detector will ignore any pre-set time delays in the event of an unacceptably rapid increase in smoke density, thereby minimising response time to 'rapid growth' fires. This function would normally only be used where there are significant time delays programmed on the alarm levels. This function is disabled by default.

### 3.10 **Demo mode - Alarm levels and delays tab**

Demonstration mode is an operating mode whereby the normal full 24-hour learning period is shortened, so that the detector can reach high sensitivity after only the 15 minute FastLearn period. This can be useful when initial smoke testing and other commissioning needs to be carried out. To initiate Demo Mode tick this box and then "OK", while the detector is in FastLearn mode (i.e. the green light is flashing).

*Important Note: It must be understood that, since the alarm levels will be based solely upon the sparse data gathered only during the 15 minute FastLearn period, there is an increased risk of nuisance alarms. For this reason, the detector should not be left in Demo mode for normal use.*



### 3.11 **Day start / Night start - Day/Night switching tab**

These values are the times to the nearest hour at which the day/night switching is desired to take place. Entries are made in 24-hour format, e.g. 19 for 7pm. Day and night switching may be desirable where the smoke density is expected to be different between occupied and unoccupied conditions. ClassiFire automatically detects the change in smoke level when the protected area is vacated and, if the time at which this occurs is within  $\pm 70$  minutes of the preset switchover time, it selects the previous night time histogram. Changes in time setting, e.g. changing to summer/daylight saving time may be ignored as the detector also automatically adjust its day/night setting times. The default times for day and night start are 08:00 and 19:00 respectively.

### 3.12 **Disable Day / Night switching - Day/Night switching tab**

If day/night switching is considered undesirable, the **Disable day/night switching** box may be ticked to leave the detector permanently in day mode.

### 3.13 **Remote functions - Alarm actions tab, Remote input subgroup**

The following three functions are only applicable to those detectors fitted with optional cards providing inputs. Before operation the appropriate function box must be ticked and the relevant pair of input terminals must be nominated (Input 1, 2 or 3). The function will remain activated whilst the relevant pair of input terminals are 'shorted' together.

#### **Remote Isolate**

Isolates the detector, no alarm signals are sent from the detector. For the duration that the detector is isolated the fault relay will be activated. If the fault relay is not connected to the main Fire Alarm Panel it is suggested that the relay be monitored to minimise the possibility of the detector being inadvertently left isolated. Ordinarily, a latching switch would be used for this application.

### **Remote Reset**

Resets any current alarm or fault condition. Ordinarily, a momentary, push-button switch would be used for this application.

### **Remote Day / Night Switching**

The remote day night switching (as detailed in section 3.11) is manually overridden. Ordinarily a latching switch would be used for this application.

### **3.14 Programmed Isolate - Alarm actions tab**

*When this function is ticked, the detector will not generate alarms and will not indicate a fault condition on any fire panel which is connected. This is only for use during detector maintenance. The "Fault" light will be illuminated on the detector indicator panel. If accidentally left in Programmed Isolate condition, the function will be automatically disabled after 7 days, re-arming the detector. This function is disabled by default.*



**IMPORTANT**

### **3.15 Latching alarms - Alarm actions tab**

When this function box is ticked, a Reset signal from a remotely located Command Module, a PC running SenseNET software, or a remote reset switch is required to clear an alarm condition.

If unticked, the alarm signal is extinguished as soon as the alarm condition ends. This is the factory default setting. *Important Note: It is also possible to reset latched alarms by connecting a PC equipped with Remote Control Software via the 9 pin serial port located under the screw down cover. In most areas this action would require a Hot Work permit.*



**IMPORTANT**

### **3.16 Latching faults - Alarm actions tab**

When this function box is ticked it requires a Reset signal from a remotely located Command Module, a PC running SenseNET software, or remote reset switch to clear a fault condition.

If unticked, the fault signal is extinguished as soon as the condition ends. This is the factory default setting. *Important Note: It is also possible to reset latched faults by connecting a PC equipped with Remote Control Software via the 9 pin serial port located under the screw down cover. In most areas this action would require a Hot Work permit.*



**IMPORTANT**

### **3.17 Cascading alarms - Alarm actions tab**

When this function box is ticked the detector's controller will not permit a Fire alarm to be generated before a Pre-alarm signal. This situation could otherwise occur if there were a long time-delay set on Pre-Alarm and a short or non-existent delay on Fire Alarm level. This function is enabled by default.

### **3.18 Device type - Device information tab**

*This function identifies the type of detector as Stratos-Ex. This is set in the Firmware and cannot be changed.*

### **3.19 Firmware version - Device information tab**

This function is for display purposes only. It shows the version number of the fitted firmware chip.

### **3.20 Run-time hours - Device information tab**

This function is for display purposes only. It shows the cumulative total number of hours that the device has run (*NB: this is not the time that has elapsed since last power-up, but the sum total of run time since the detector memory was last reset*).

### **3.21 Watchdog count - Device information tab**

The Watchdog is a system incorporated in the controller electronics that restarts the controller in the event of a failure to function properly, which might be experienced as a result of severe electrical noise. This counter shows the number of interruptions recorded. The details of each Watchdog reset can be found in the event log. (See section 8, 'Event log' for further details).

### **3.22 Device text - Device information tab**

This function is for display purposes when connected to a Command Module or controlling PC running SenseNET software. It can be modified for zonal or area identification. By default it shows **Stratos-Ex**.

### **3.23 Reference detector - Referencing tab**

A Stratos-Ex detector may use another detector as a fresh air Reference as part of the product's ability to compensate for the effect of external contamination to the protected environment. This function is for setting the address of the detector which will be used as the Reference detector.

To set a detector as a Reference detector on the Remote software, enter its address (as set by its internal DIP switch) into this function. This function is disabled by default.

### **3.24 Reference enable - Referencing tab**

Tickling this box enables a Reference detector, if one has previously been allocated in **Reference detector** (See section 3.23) This function is disabled by default.

### **3.25 Reference level - Referencing tab**

The value set with this function is the percentage of reference detector signal which will be subtracted from the detector's signal if a reference device has been allocated. The default value is 0.

### **3.26 Reference back-off - Referencing tab**

This value is the delay time in minutes between a build up of pollution being seen by the Reference detector (if used) and the pollution being seen by the detector. The default value is 15 minutes.

### **3.27 Flow rate - Flow monitoring tab**

This function is for display purposes only. It shows a value corresponding to the airflow rate through the detector.

### **3.28 Flow high limit - Flow monitoring tab**

This value is the level above which the airflow needs to increase to indicate a high flow fault condition. The most probable cause will be a damaged sampling pipe or changes in air conditioning systems.

**Flow low limit** and **Flow high limit** parameters are automatically set up on initial power-up, after the detector has established normal flow conditions.



### 3.29 Flow low limit – Flow monitoring tab

This value is the level below which airflow needs to be reduced to indicate a fault reading. The most probable causes include: blocked or damaged sampling pipe (or filter). **Flow low limit** and **Flow high limit** parameters are automatically set up on initial power-up, after the detector has established normal flow conditions. *Important Note - The screwdown cover must be fitted during the flow setup process.*

### 3.30 Aspirator speed – Flow monitoring tab

This function has no current use on Stratos-Ex but is reserved for future expansion purposes.

### 3.31 Access code – Miscellaneous tab

This is the access code which is required to modify programmable parameters. The default code is 0102. Once the appropriate code has been entered it may be changed to any four digit number to limit future unauthorised access.

### 3.32 Chart recording rate – Miscellaneous tab

This function controls how frequently the detector and alarm level or flow rates are stored in the Stratos-Ex's internal chart recorder log. (See section 4.3, 'Chart recording').

The chart log recording rates are as follows.

setting	type	storage interval	time per division on chart log
0	Detector output	1 second	10 seconds
1	Detector output	5 seconds	50 seconds
2	Detector output	12 seconds	2 minutes
3	Detector output	30 seconds	5 minutes
4	Detector output	1 minute	10 minutes
5	Detector output	2 minutes	20 minutes
6	Detector output	5 minutes	50 minutes
7	Detector output	10 minutes	100 minutes
8	Detector output	20 minutes	200 minutes
9	Detector output	50 minutes	500 minutes
10	flow recording	1 second	10 seconds
11	flow recording	5 seconds	50 seconds
12	flow recording	12 seconds	2 minutes
13	flow recording	30 seconds	5 minutes
14	flow recording	1 minute	10 minutes
15	flow recording	2 minutes	20 minutes
16	flow recording	5 minutes	50 minutes
17	flow recording	10 minutes	100 minutes
18	flow recording	20 minutes	200 minutes
19	flow recording	50 minutes	500 minutes

In the above table, the grey section indicates flow rate recording, and the white section indicates detector and alarm level recording.

At the slowest recording rate, one month of data can be recorded. The factory default setting is 8.

### 3.33 Separator condition – Miscellaneous tab

The value given at this function is the efficiency rating of the dust separator elements located in the remote dust separator enclosure (See section 10, "Maintenance"). This value is a percentage of the efficiency of a clean separator. When ClassiFire measures that the efficiency has decreased to 80% of that of a new filter, the Fault indicator LED will illuminate and the event log will show "Separator renew".

*Important Note - When fitting new Dust Separator cartridges, a FastLearn must be initiated (See section 3.07).*



### 3.34 Separator change date – Miscellaneous tab

This function defaults to "--", which means that a separator fault will only appear when the efficiency decreases to 80% (See 3.33, "Separator condition"). However, a date may be entered into this function to allow for a scheduled maintenance period. The detector will then generate a separator fault at the planned time regardless of the condition of the separator, although degradation of the separator to below 80% efficiency before this date will override this. (See section 10, "Maintenance").

### 3.35 Factory default – Miscellaneous tab

Enabling this function will reset each programmable function to the default value indicated in the text, where a default setting is specified. It will also put the detector into FastLearn mode, regardless of whether or not Auto Fastlearn is enabled (See section 3.08). This ensures that the flow setups and alarm thresholds are optimised to the detector's working environment after resetting. *Important Note - Where a ClassiFire alarm factor other than the default is required for the protected area, this will need to be re-entered. Section 3.05 gives details of the ClassiFire alarm factors.*

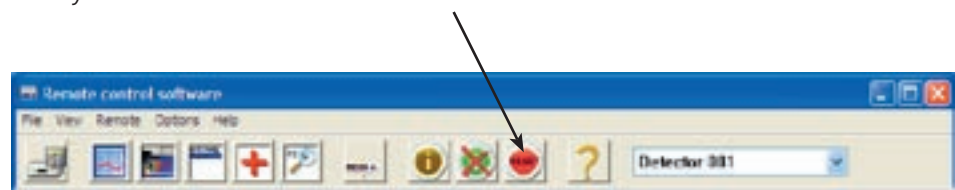


## 4. Other remote software features

### 4.01 Reset

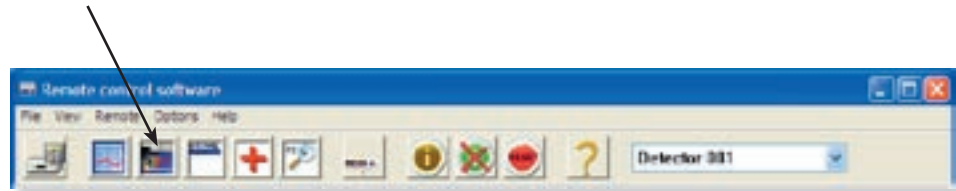
If latching alarms (See section 3.15) or latching faults (See section 3.16) are enabled, the relevant alarm or fault warnings will remain on the detector front panel LEDs and controlling unit until a reset is performed. If using SenseNET software, individual detectors can be reset (refer to the SenseNET User Guide for details). In the remote software, a Global reset is available which resets all detectors on the SenseNET loop, or a single stand-alone detector.

To perform a reset, either select the menu options "Options [ ] Global Reset" or click the symbol indicated below.

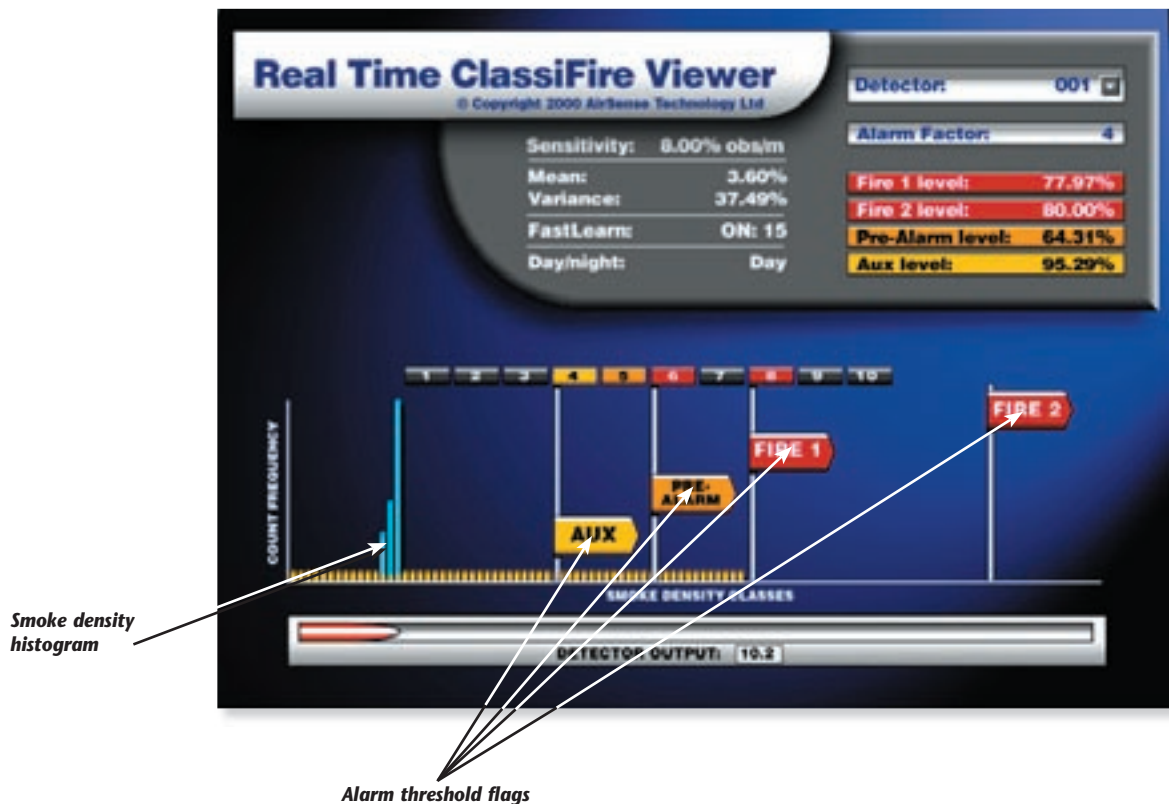


## 4.02 Histogram screen

The histogram screen shows various aspects of the detector function. To enter the histogram screen, either select the menu options 'View ▢ Histogram viewer...' or click the symbol indicated below.



The following screen appears:



There are two types of smoke density histogram; one shown in blue (the 'fast' histogram) which completely updates every 15 minutes, feeding information to the long-term 'slow' histograms (which appear in yellow). These set the detector sensitivity based on the ambient smoke conditions and it takes 24 hours for the two slow histograms (the 'day' and the 'night' histograms) to complete their learning phase (See section 3.07). Detector sensitivity is based on the fast histogram during FastLearn and is thereafter based on the currently active slow histogram.

**Sensitivity:** This is a measure of the increase in smoke density required for the detector to produce an alarm. The value is given in % obs/m (% obs/ft if US English selected).

**Mean:** The current mean (average) value of smoke density, taken from the currently 'active' histogram and given as a percentage of full scale deflection of the detector output.

**Variance:** The 'spread' of data in the currently active histogram showing the width of the distribution of readings.

**FastLearn:** If the detector is currently in FastLearn mode, this will show the number of minutes remaining in the FastLearn period. When this period has elapsed it will read "OFF" (Please note the product will require a full 24 hr period to achieve full sensitivity).

**Alarm factor:** This is the ClassiFire alarm factor (See section 3.05, 'ClassiFire Alarm factor').

**Day/night:** This indicates the currently active slow histogram.

**Alarm levels:** These figures give the position of the various alarm flags in terms of a percentage of full scale deflection of the detector output.

**Detector output:** This shows the real-time reading of smoke levels in terms of a percentage of full scale deflection.

### 4.03 Chart recording

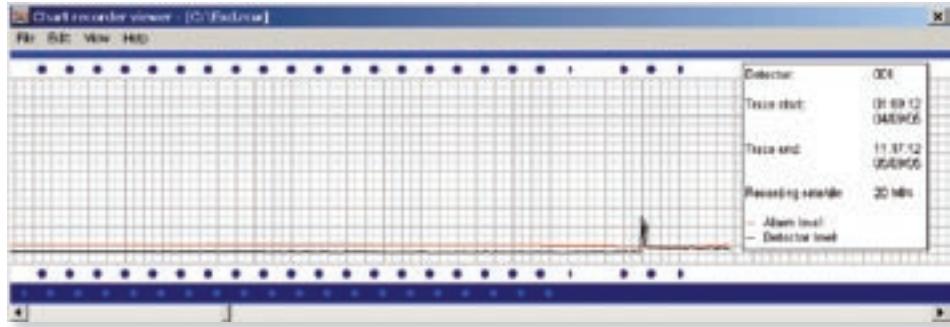
The chart recording function shows how smoke density and the alarm level in the protected area have varied over time. The chart may be downloaded to disk or printed out from a connected printer.

To access the chart log, select the menu options 'View □ Chart recording...' or click the symbol indicated below.



The chart recording function may also be used to record how flow level through the Stratos-Ex detector varies with time. (See table at 3.32 for details).

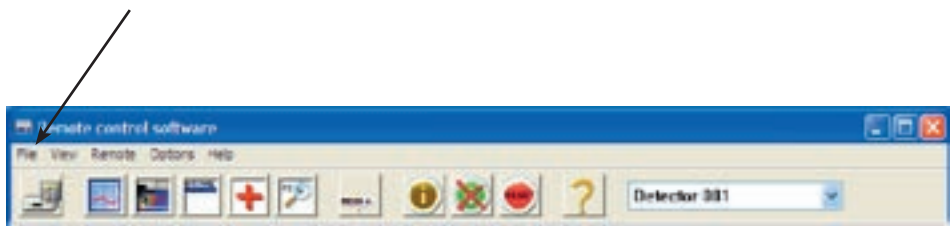
The following screen appears:



The red trace is the current alarm level and the black trace is the detector output. By moving the cursor along the chart, the "Chart information" window (shown at the bottom left) updates to show the date and time, detector level and alarm level of the relevant period. The 'File' menu option in the chart recording window allows the chart recording to be saved to disk or printed to a connected printer, and allows a previously saved chart recording to be loaded. Chart recording files have the extension ".rcw".

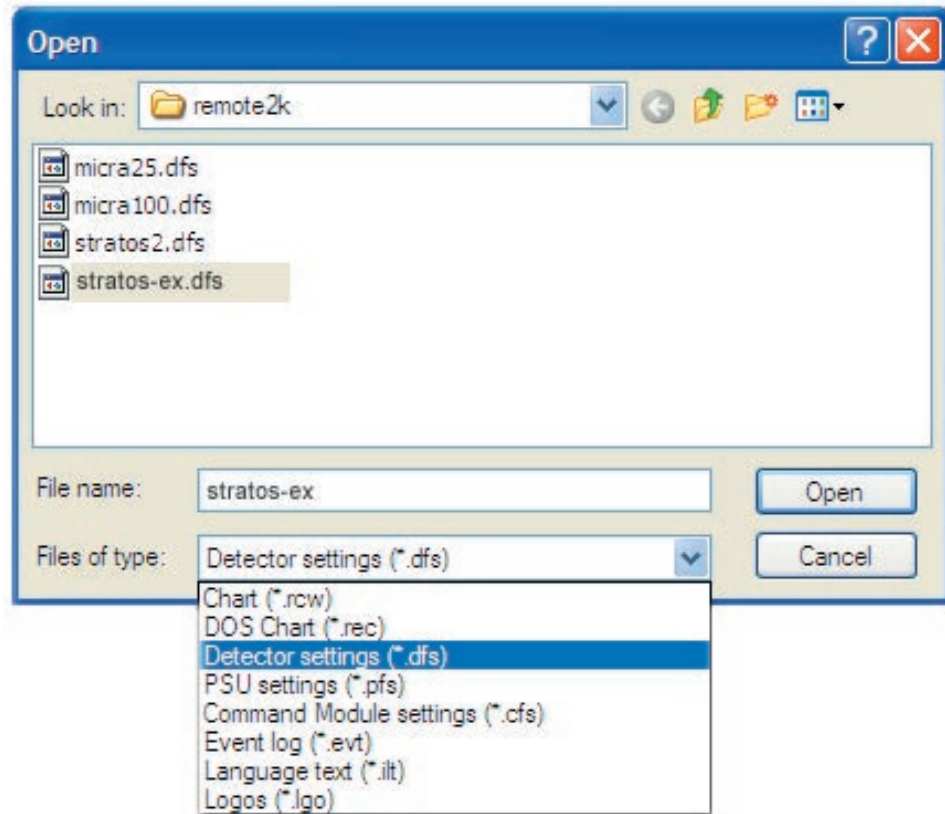
#### 4.04 Open file

Where a custom set of programmable function settings is commonly used, these may conveniently be saved to, or loaded from disk. To open a detector function settings (.dfs) file, select the menu options "File > Open" or click on the symbol indicated below.



This function can also be used to examine saved event logs or chart recordings.

Click on the “List files of type” drop-down box and select “Detector settings (\*.dfs)” as indicated below.



A list will appear of all detector settings files stored on the current drive. As a special case, if desiring to recall the factory default settings, there is a file named 'default.dfs' in the 'remote2k' directory. Loading this file will reset the detector to the factory default.

## 5. Design Limitations



### IMPORTANT

Stratos-Ex is intended to provide incipient fire detection. It is suitable for the range of applications typified by non-compartmentalised rooms, or items of electronic or electromechanical equipment where it is desirable to achieve incipient fire reporting. In compartmentalised rooms, each compartment would normally use individual Stratos-Ex detectors.

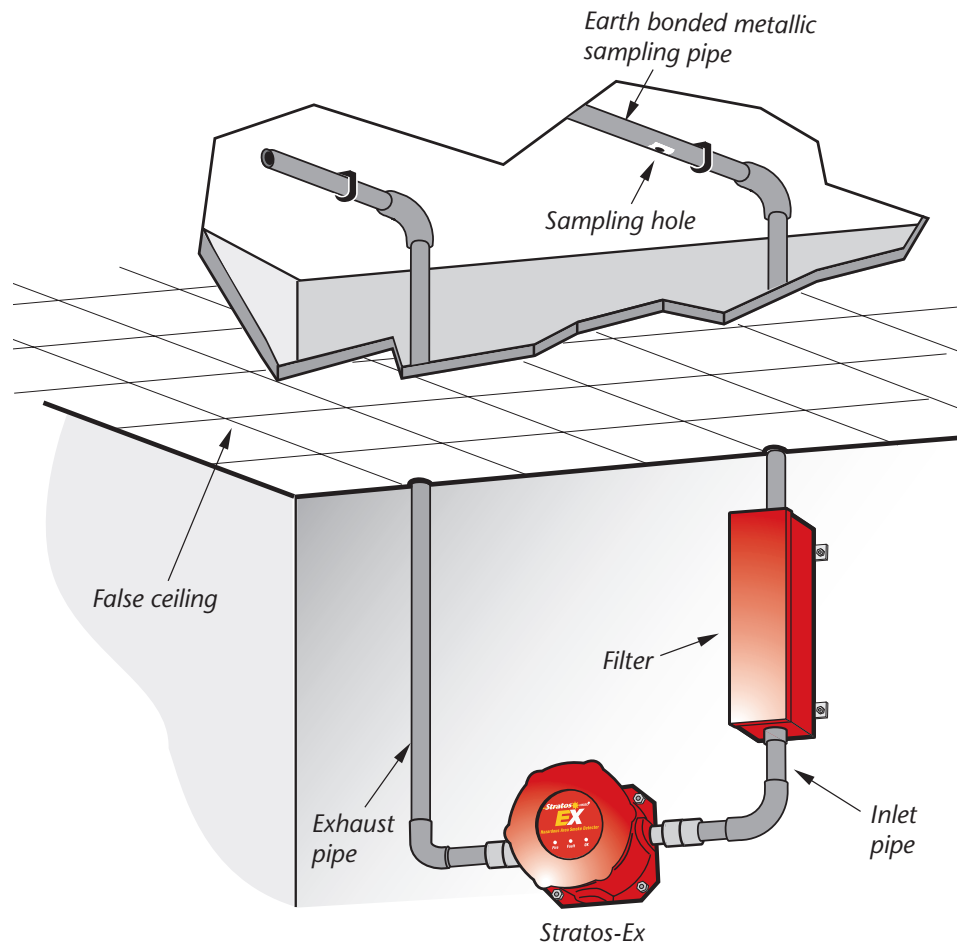
Stratos-Ex is not intended to protect large areas, or to sample from areas where there may be any difference in airflow rates or pressure differentials. Application of Stratos-Ex in these circumstances is not recommended. If detection in environments conforming to these descriptions is required, care must be taken to return sampled air to the protected volume.

Maximum recommended sampling pipe length is 50 metres in STILL AIR. In areas or applications where the external airflow rate is greater than 1 metre per second, the maximum sampling pipe length is reduced to 25 metres.

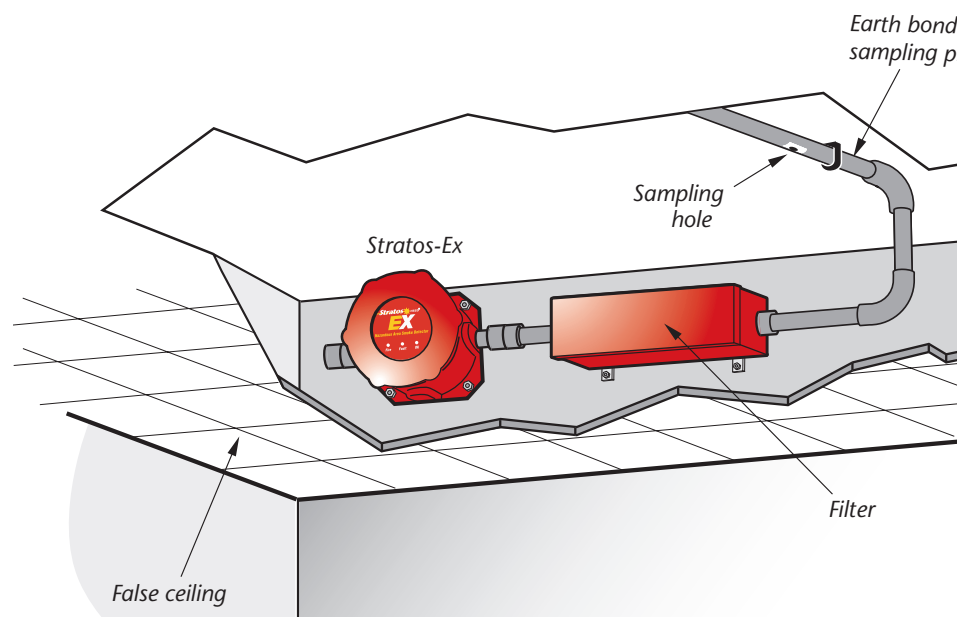
Although by no means essential, it must be recommended that if in doubt, PipeCAD™ sampling pipe modelling program be used to ensure that transit times, balance of suction and individual sampling point sensitivity are within desired limits.

Sampling pipes must have capped ends. The end cap should be drilled with a hole normally between 4 and 10mm diameter and free from burrs. Sampling holes should normally be 2.5 - 4mm diameter or as calculated by PipeCAD™, and free from burrs. The pipe run should not have more than 10 holes (including the end cap hole). Pipe transit time from the furthest sampling hole from the detector must not exceed 120 seconds. To prevent potentially dangerous build-up of static electricity, pipe networks should use metallic pipe electrically bonded to Earth/Ground. It is strongly recommended that the smoke transit time from the furthest sampling hole be checked during commissioning tests.

**(a.) Locating the detector outside the area to be protected**



**(b.) Locating the detector within the area to be protected**



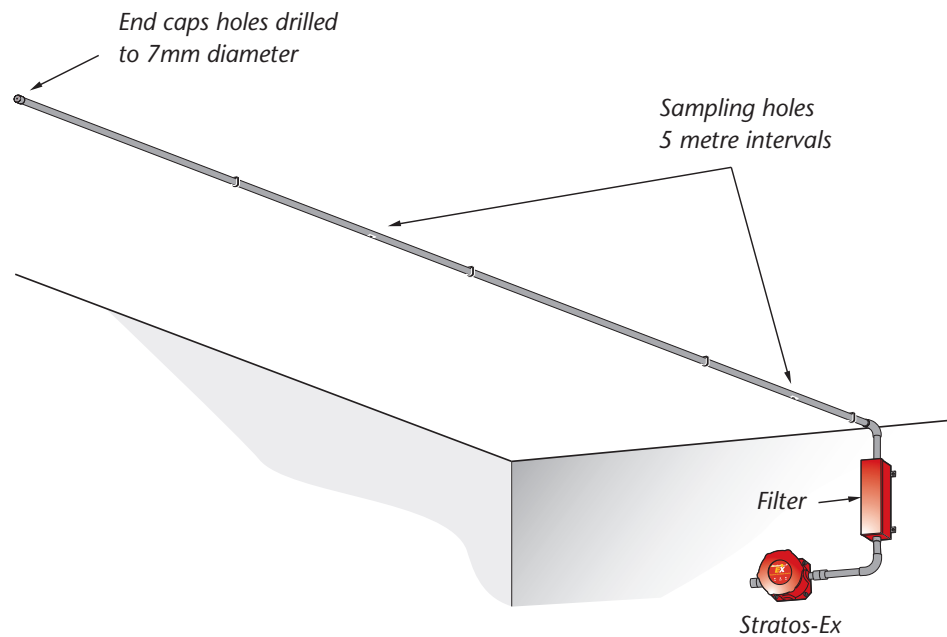
### 5.01 System Design

Simple designs with short sampling pipes produce the best results. Complex sampling pipe runs should be avoided. The use of 'T' branch-pipes is not recommended. To assist in design and to verify system performance, it is advisable to use the AirSense PipeCAD™ sampling pipe modelling software.

Always locate the sampling points in positions to which smoke may reasonably be expected to travel. Do not expect ceiling-mounted sampling points to operate satisfactorily if air flow from air-conditioning systems keeps the cool smoke from an incipient fire from reaching ceiling level. In this instance it is usually better to locate the sampling pipe directly in the airflow (for example across the return air register of an air conditioning unit).

There is no substitute for carrying out smoke tests prior to installation of pipe work to indicate suitable sampling point location. Remember that cool smoke from an incipient fire does not behave in the same manner as hot smoke.

### 5.02 Suggested maximum sampling pipework configurations



## 6. Installation

Before installing the detector, the local standards for hazardous areas and for installation of aspirating detection systems must be consulted, as these standards differ throughout the world. Specific advice for one country may not be applicable to another. The following is a brief set of guidelines on installing detectors.

- The detector will normally be mounted at a level where there is easy access to the unit for configuration and programming.
- Pipework should be metal and bonded to Earth/Ground to eliminate static electricity build-up. Selection of pipe is left to the site engineers, but the internal diameter should be between 20 and 25mm.
- The exhaust air from the unit must not be impeded in any way. If the unit is mounted in a different air pressure from where the air is being sampled (for example an air duct), then a pipe must be taken from the exhaust port back to the same air pressure zone as the sampling holes.
- Sampling holes should be free from burrs and swarf.
- All signal cables must be screened and must be of a suitable type. The specific type of cable will normally depend upon the local fire and hazardous area regulations.
- The unit must not be placed in areas where either the temperature or humidity is outside the specified operating range.
- The unit should not be placed in close proximity to any equipment expected to generate high Radio Frequency levels (such as radio alarms) or units generating high levels of electrical energy (such as large electric motors or generators).

### 6.01 Stratos-Ex enclosure installation

The Stratos-Ex detector must be fixed to a solid location using the four mounting screw holes supplied.

A template has been included at the back of this installer's handbook to simplify mounting.

**Enclosure mounting points (arrowed)**



## Standards and Requirements

The installer should refer to the latest edition of the following standards before operating in a Hazardous Area:

**EN 1127-1** Explosive Atmospheres – Explosion prevention and protection, basic concepts and methodology.

**EN 60079-14** Electrical apparatus for explosive gas atmospheres Part 14: Electrical installations in hazardous areas (other than mines).

**EN 60079-17** Electrical apparatus for explosive gas atmospheres Part 17: Inspection and maintenance of electrical installations in hazardous areas (other than mines).

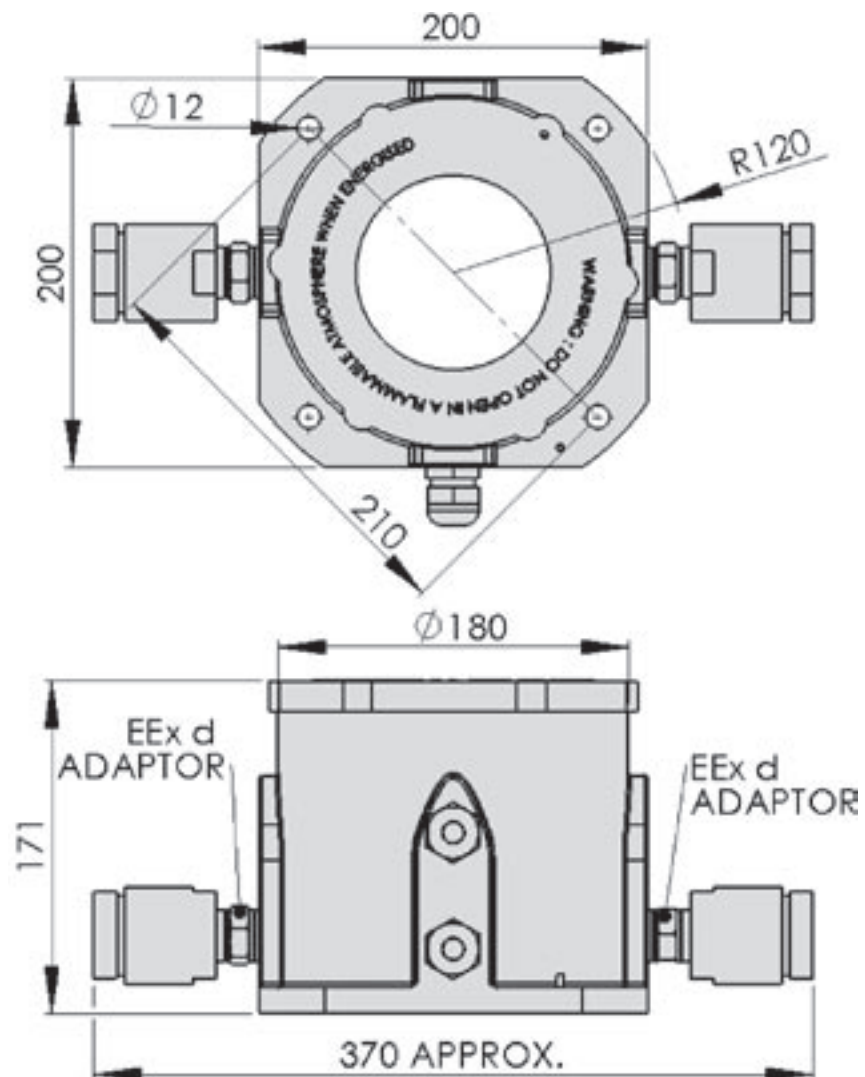
## Warnings

- The apparatus is ATEX CAT 2, only to be installed in Hazardous Area Zone 1 or Hazardous Area Zone 2.
- The installer is to ensure that the equipment is located in areas that are known not to have adverse affect on the housing material.
- Do not modify the enclosure or component parts as this will compromise the apparatus certificate.
- The area in which the detector may be mounted must be in accordance with the certification of the apparatus and in accordance with the standards of the appropriate authority in the country concerned.
- Local standards for the installation of aspirating detection systems must be consulted.
- The detector should normally be mounted at a level where there is easy access to the unit for configuration and programming.
- Pipework should be metal and bonded to Earth/Ground to eliminate static electricity build-up. Selection of pipe is left to the site engineers, but the internal diameter should be between 20 and 25mm.
- The exhaust air from the unit must not be impeded in any way. If the unit is mounted in a different air pressure from where the air is being sampled (for example an air duct), then a pipe must be taken from the exhaust port back to the same air pressure zone as the sampling holes.
- Sampling holes should be free from burrs and swarf.

- All signal cables must be screened and must be of a suitable type. The specific type of cable will normally depend upon the local fire and hazardous area regulations.
- The unit must not be placed in areas where either the temperature or humidity is outside the specified operating range.
- The unit should not be placed in close proximity to any equipment expected to generate high Radio Frequency levels (such as radio alarms) or units generating high levels of electrical energy (such as large electric motors or generators).

### Enclosure Installation

The Stratos-Ex detector must be fixed to a solid location using the four fixing holes. A template has been included at the back of this manual to simplify mounting.



*Stratos-Ex, Fixing Hole Location*

### 6.01.2 Mechanical installation

The enclosure is connected to the installed sampling pipe-work and fixed to the wall or mounting surface using 4 bolts of a type appropriate to the mounting surface. It is essential that the sampling and exhaust pipes are properly screwed into the flame arrestors. Ensure that arrestors and EX approved adaptors are still properly engaged with a minimum of 5 threads engaged after sampling and exhaust pipes are fitted. **Important Note - The screw down protective cover must be securely tightened and locked in position by means of the lid locking set-screw (See section 1).**



### 6.02 Electrical installation

The Stratos-Ex detector is supplied with removable terminal blocks (See illustrations in section 2.02). These are simply removed from their sockets by lifting them up at right angles to the circuit board. Take note of the orientation of each terminal block and its function before removing it. It may also be beneficial to mark the connection wires with suitable identification labels or coloured rings to aid in the connection process. **NB: All connections should be made with the power turned off.**

To maintain the integrity of the flame proof enclosure it is important that all the cables are properly terminated to compatible glands. Cable glands are not supplied, as cable selection is up to the site engineer. All cable glands holes to be fitted with EEx d certified cable glands or EEx d certified gland plugs. All enclosure threads to BS3643:1981 class 6g & 6H with a minimum of 5 threads engaged. Cables to be fitted using gland manufacturers installation instructions.

#### Wiring

**Before proceeding with the removal of the lid, it should be verified that the surrounding area is not explosive. In most applications, removal of the screw-down cover will require a Hot Work permit.**



Remove the lid locking set screw (See section 1).

Remove the lid by unscrewing anti-clockwise, place in a safe place to avoid damage.

Remove the four screws, which secure the display on to the supporting pillars (arrowed).

After disconnecting both the ribbon cable and LED connectors the display can then be removed to reveal the main detector assembly.



The cable glands are fitted and the cables carefully threaded up the sides of the detector assembly.



The cables should then be cut to a suitable length, this should be the shortest possible length that will comfortably allow the plugs to fit their respective sockets. The cables should be routed so as to avoid damage when replacing the display and screw-down cover.



The display LED connectors should then be re-connected. The respective connectors on the PCB are designated Green, Red and Amber, the colours relate to the colour LEDs on the Display; "OK", "Fire" and "Fault" respectively. The ribbon cable should also be re-connected to the socket designated "RS232" on the detector assembly PCB.

Re-fit the display using the correct four screws.



### 6.02.1 Power supply connections

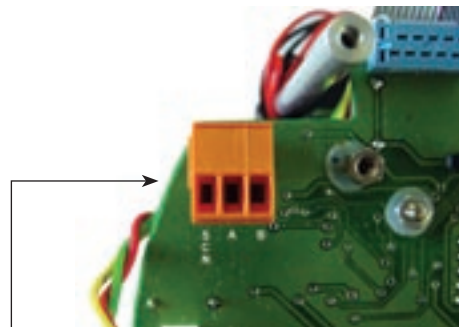
The power supply cable should be of 3-core screened type and should be led through cable gland 1 or 2, leaving about 170mm of the cable extending from cable gland 1 or 100mm from cable gland 2.



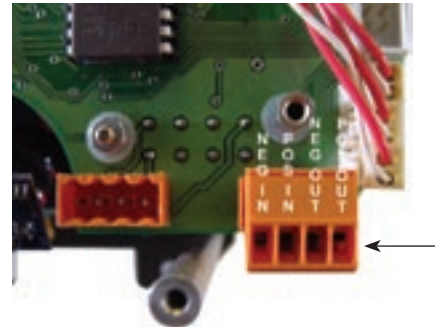
The supplied ferrite bead should be threaded over the power cables before connecting to the terminal block.

*NB, note the orientation of the terminal block.*  
Connect 0V and +24VDC to the "0V" and "24V" screw terminals respectively. Connect the earth to the earth terminal.

### 6.02.2 Signal connections



**RS485 (SenseNET terminals)**



**APIC address terminal**

Signal connections should be made using cable suitable for the hazardous area and compatible cable glands. If RS485 connection is used, the A+B signals should ideally be taken through twisted pair cable. The SCN terminal should be connected to the cable screen if possible, otherwise a third conductor should be used.

Signals and power should not normally be in the same cable, as electrical noise can jump between conductors.

### 6.03 Final installation

Slot the power and signal terminal blocks into the relevant sockets on the detector PCB (they will only click fully home in the correct orientation), replace the front display using the four M3 pan-head screws provided and replace the enclosure lid. (See figs. 1-3).



*Important Note: The detector can only operate properly with the lid securely fitted.*

**Fig. 1**



**Fig. 2**



**Fig. 3**

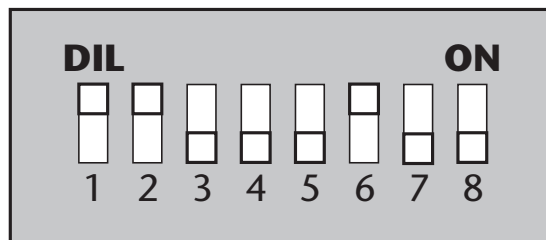


## 7. Interfacing

Because of the flexible nature of the *Stratos-Ex*® detector and the many possible configurations, there are many options for interfacing the detectors to the Fire Panel. Because of this, it is not possible to give a complete list of all interfacing methods but the following pages will give details of the most common methods that are likely to be used.

### 7.01 Setting the detector address

In order to identify itself to a PC or Command Module, each detector on a SenseNET network needs to have a unique address ranging from 1 to 127. The detector address is simply set on the red DIP switch SW1 at the top right of the opened detector on the main circuit board. The switch settings are 'on' for 1 and 'off' for 0, and the detector address is set as a 7-bit binary code using switches 1-7. (Switch 8 is not used). An example is shown below.



The address equates to 00100011 in binary, or  $(1 \times 1) + (1 \times 2) + (0 \times 4) + (0 \times 8) + (0 \times 16) + (1 \times 32) + (0 \times 64) = 35$ .

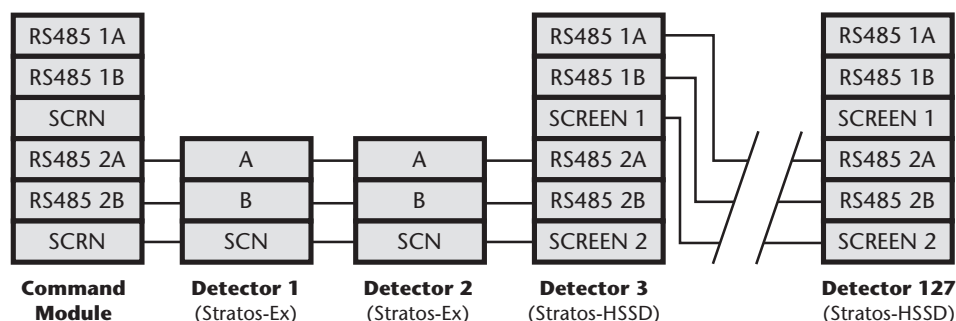
The full range of available addresses and their relevant switch settings are in section 7.01.2 for reference.

### 7.01.2 Address table

When multiple detectors are used on a SenseNET bus, addresses chosen for detectors must all be different.

ADDRESS	1	2	3	4	5	6	7	8
1	1	0	0	0	0	0	0	0
2	0	1	0	0	0	0	0	0
3	1	1	0	0	0	0	0	0
4	0	0	1	0	0	0	0	0
5	1	0	1	0	0	0	0	0
6	0	1	1	0	0	0	0	0
7	1	1	1	0	0	0	0	0
8	0	0	0	1	0	0	0	0
9	1	0	0	1	0	0	0	0
10	0	1	0	1	0	0	0	0
11	1	1	0	1	0	0	0	0
12	0	0	1	1	0	0	0	0
13	1	0	1	1	0	0	0	0
14	0	1	1	1	0	0	0	0
15	1	1	1	1	0	0	0	0
16	0	0	0	0	1	0	0	0
17	1	0	0	0	1	0	0	0
18	0	1	0	0	1	0	0	0
19	1	1	0	0	1	0	0	0
20	0	0	1	0	1	0	0	0
21	1	0	1	0	1	0	0	0
22	0	1	1	0	1	0	0	0
23	1	1	1	0	1	0	0	0
24	0	0	0	1	1	0	0	0
25	1	0	0	1	1	0	0	0
26	0	1	0	1	1	0	0	0
27	1	1	0	1	1	0	0	0
28	0	0	1	1	1	0	0	0
29	1	0	1	1	1	0	0	0
30	0	1	1	1	1	0	0	0
31	1	1	1	1	1	0	0	0
32	0	0	0	0	0	1	0	0
33	1	0	0	0	0	1	0	0
34	0	1	0	0	0	1	0	0
35	1	1	0	0	0	1	0	0
36	0	0	1	0	0	1	0	0
37	1	0	1	0	0	1	0	0
38	0	1	1	0	0	1	0	0
39	1	1	1	0	0	1	0	0
40	0	0	0	1	0	1	0	0
41	1	0	0	1	0	1	0	0
42	0	1	0	1	0	1	0	0
43	1	1	0	1	0	1	0	0
44	0	0	1	1	0	1	0	0
45	1	0	1	1	0	1	0	0
46	0	1	1	1	0	1	0	0
47	1	1	1	1	0	1	0	0
48	0	0	0	0	1	1	0	0
49	1	0	0	0	1	1	0	0
50	0	1	0	0	1	1	0	0
51	1	1	0	0	1	1	0	0
52	0	0	1	0	1	1	0	0
53	1	0	1	0	1	1	0	0
54	0	1	1	0	1	1	0	0
55	1	1	1	0	1	1	0	0
56	0	0	0	1	1	1	0	0
57	1	0	0	1	1	1	0	0
58	0	1	0	1	1	1	0	0
59	1	1	0	1	1	1	0	0
60	0	0	1	1	1	1	0	0
61	1	0	1	1	1	1	0	0
62	0	1	1	1	1	1	0	0
63	1	1	1	1	1	1	0	0
64	0	0	0	0	0	0	1	0
65	1	0	0	0	0	0	1	0
66	0	1	0	0	0	0	1	0
67	1	1	0	0	0	0	1	0
68	0	0	1	0	0	0	1	0
69	1	0	1	0	0	0	1	0
70	0	1	1	0	0	0	1	0
71	1	1	1	0	0	0	1	0
72	0	0	0	1	0	0	1	0
73	1	0	0	1	0	0	1	0
74	0	1	0	1	0	0	1	0
75	1	1	0	1	0	0	1	0
76	0	0	1	1	0	0	1	0
77	1	0	1	1	0	0	1	0
78	0	1	1	1	0	0	1	0
79	1	1	1	1	0	0	1	0
80	0	0	0	0	1	0	1	0
81	1	0	0	0	1	0	1	0
82	0	1	0	0	1	0	1	0
83	1	1	0	0	1	0	1	0
84	0	0	1	0	1	0	1	0
85	1	0	1	0	1	0	1	0
86	0	1	1	0	1	0	1	0
87	1	1	1	0	1	0	1	0
88	0	0	0	1	1	0	1	0
89	1	0	0	1	1	0	1	0
90	0	1	0	1	1	0	1	0
91	1	1	0	1	1	0	1	0
92	0	0	1	1	1	0	1	0
93	1	0	1	1	1	0	1	0
94	0	1	1	1	1	0	1	0
95	1	1	1	1	1	0	1	0
96	0	0	0	0	0	1	1	0
97	1	0	0	0	0	1	1	0
98	0	1	0	0	0	1	1	0
99	1	1	0	0	0	1	1	0
100	0	0	1	0	0	1	1	0
101	1	0	1	0	0	1	1	0
102	0	1	1	0	0	1	1	0
103	1	1	1	0	0	1	1	0
104	0	0	0	1	0	1	1	0
105	1	0	0	1	0	1	1	0
106	0	1	0	1	0	1	1	0
107	1	1	0	1	0	1	1	0
108	0	0	1	1	0	1	1	0
109	1	0	1	1	0	1	1	0
110	0	1	1	1	0	1	1	0
111	1	1	1	1	0	1	1	0
112	0	0	0	0	1	1	1	0
113	1	0	0	0	1	1	1	0
114	0	1	0	0	1	1	1	0
115	1	1	0	0	1	1	1	0
116	0	0	1	0	1	1	1	0
117	1	0	1	0	1	1	1	0
118	0	1	1	0	1	1	1	0
119	1	1	1	0	1	1	1	0
120	0	0	0	1	1	1	1	0
121	1	0	0	1	1	1	1	0
122	0	1	0	1	1	1	1	0
123	1	1	0	1	1	1	1	0
124	0	0	1	1	1	1	1	0
125	1	0	1	1	1	1	1	0
126	0	1	1	1	1	1	1	0
127	1	1	1	1	1	1	1	0

## 7.02 Connecting a Stratos-Ex to a SenseNET/RS485 detector network



Up to 127 detectors may be linked in a single SenseNET bus, supporting a total length of cable of up to 1.2km. This can be extended with the use of RS485 repeaters. Stratos-HSSD detectors have built-in repeaters.

In the above example, two Stratos-Ex detectors are linked into a 127-detector bus with a Command Module and a number of Stratos-HSSD detectors. It will be noted that whereas the Stratos-HSSD units have two input / output buses (1A / 1B and 2A / 2B), the Stratos-Ex has only a single such bus (A / B) and therefore each bus terminal has an input and an output wire, compared with a single wire in each terminal in the Stratos-HSSD.

For this reason, it may be easier to join the input and output wires for each bus and screen connections together and to solder or crimp a single wire or connecting ferrule to each wire pair so that they are easier to fit into the screw terminals. If this is done it is recommended that bare wire joints be insulated to prevent possible shorting of the data bus, which will cause a drop-out of data on the SenseNET bus.

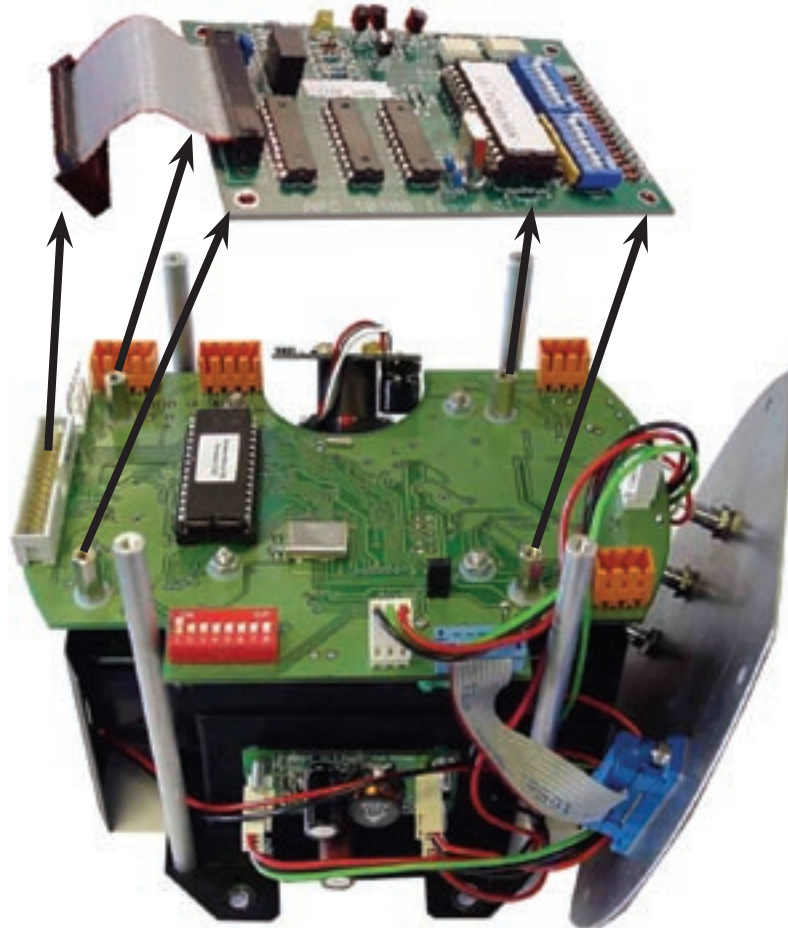
In the above example, there could be a total length of RS485 cable of up to 1.2km between the Command Module and Detector 3, since these are all on a single bus. However, Detector 3 is a Stratos-HSSD which has a second communications bus (RS485 bus 2) and an RS485 repeater. This allows a further total of 1.2km of cable until the next Stratos-HSSD in the RS485 loop.

In the above example, if detectors 3-126 (not shown) were all of the Stratos-Ex type then the total length of wiring between detectors 3 and 127 would be limited to 1.2km without an optional bus isolator board fitted. However, each additional Stratos-HSSD detector wired up using both RS485 buses would allow an additional 1.2km of cabling to be added to the RS485 loop.

### 7.03 Connecting Stratos-Ex to an addressable Fire Panel

An Addressable Protocol Interface Card (APIC) may be used to decode detector information and to communicate this to a Fire Panel.

The APIC is fitted to the four mounting studs on the Stratos-Ex PCB using the supplied screws as shown below:



The connections to the Fire Panel are made using the BUS L1 and H1 (loop in, negative and positive) and the BUS L2 and H2 (loop out, negative and positive) terminal connectors shown in Section 6.02.2.

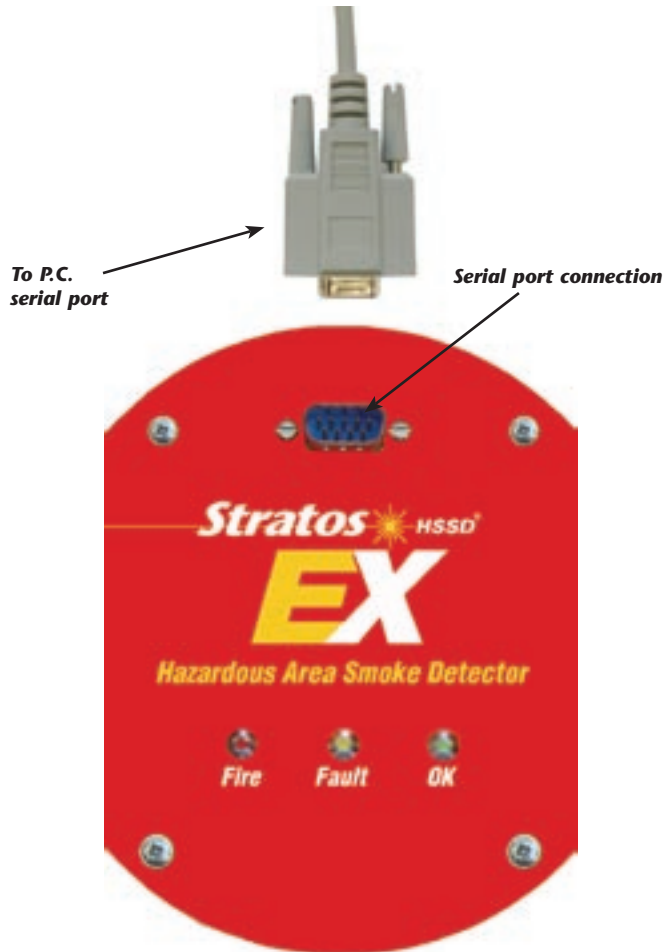
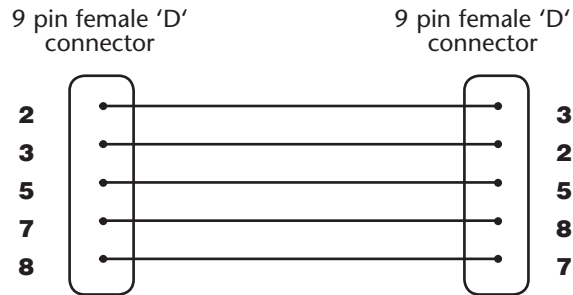
The only settings that need to be made are on the APIC address switches. The start loop address is entered on SW1 and the end loop address on SW2. In the case of an APIC fitted to a single Stratos-Ex the start and end addresses will be the same. APICs are available for several different panel communications protocols.

## 7.04 Connecting to a PC

To connect a single stand-alone detector to a PC, connect the PC's serial port directly to the detector's 9-way RS232 port. Connections for this cable are shown below.



*Important Note: Removal of the screw down cover in most applications where this product is installed will require a Hot Work permit.*



## 8. Event Log

An event is defined as

- a change to any programmed function
- a signal received from an external controller such as the remote software, APIC or SenseNET
- a detector output level meeting or exceeding the Pre-Alarm, Aux, Fire 1 or Fire 2 alarm thresholds
- a fault condition such as a flow or separator fault
- start of day / night operation
- demonstration mode start / stop
- FastLearn start / stop
- Power on or off

The detector stores an internal log of the last 200 events, and this can either be viewed on a PC screen or downloaded to disc by use of the remote control software.

When the event log is full (200 events are stored) and a new event occurs, the oldest event in the log is deleted (First-In, First-Out).

To download the event log, connect a PC to the detector serial port and run the remote software. Either select the menu options "View □ Event log" or click on the event log symbol as indicated below.



The following screen appears:

Date	Time	Device	Event
23/11/2001	10:54	001	Pre-Alarm
23/11/2001	10:50	001	Pre-Alarm
23/11/2001	10:05	001	Fire 1
23/11/2001	10:04	001	Aux
23/11/2001	10:04	001	Pre-Alarm
23/11/2001	10:03	001	Flow setup end
23/11/2001	10:03	001	FastLearn end
23/11/2001	10:03	001	Functions downloaded
23/11/2001	10:02	001	Demo mode
23/11/2001	10:02	001	Functions downloaded
23/11/2001	10:01	001	Flow setup
23/11/2001	10:00	001	FastLearn start
23/11/2001	10:00	001	Power-up
23/11/2001	09:11	001	Detector Flow
23/11/2001	09:11	001	Day start
23/11/2001	09:01	001	Fire 1
23/11/2001	09:01	001	Aux

Detector 001      Time 11:52      Date 23/11/2001

Open...    Save As...    Print...    Filter...    Close    Help...

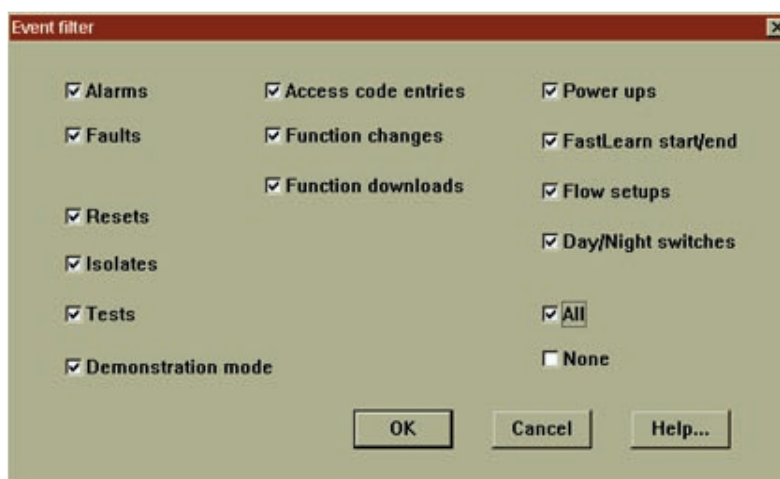
This shows the time and date of each event stored in the log along with its general description. The buttons at the bottom of the screen allow control over the input and output of the log.

**Open:** opens a previously saved event log. Event logs have the file extension '.evt'.

**Save As:** saves the current event log as a .evt file with a user defined name.

**Print:** prints the event log to a connected printer.

**Filter:** clicking on this option brings up the following screen:



This allows the user to limit the information printed or viewed on the PC screen. For example the user might wish to concentrate on alarm events only. To do this, click on '**None**', which unticks all boxes, and then on '**Alarms**'. To tick all the boxes, tick '**All**'.

Any or all of the event categories may be selected or deselected as desired.

## 9. Commissioning

Before commissioning the detector, the local standards of aspirating detection systems must be consulted. These standards differ throughout the world, and specific advice for the market in one country may not be applicable to another.

Commissioning strategy will initially depend upon the environment in which the detector is installed. The test used in a clean environment would be different to that used in a dirty environment.

For clean areas, a widely accepted test is that given in British Standard BS6266, which simulates equipment overheating at a stage well before combustion. To perform the test, electrically overload a two-metre length of PVC insulated wire of 10/0.1mm gauge for one minute using an appropriate power supply. The detector should respond within two minutes from the end of the wire overload to give an indication.

For areas with higher levels of background particulate matter, testing methodology might be similar to that of standard point detectors, or agreed in advance with the client.

Aerosol smoke should not be used, as it leaves an oily residue which can adversely affect the detector chamber and the flame arrestors. All other methods of producing smoke involve heat, so care must be taken and authority obtained before this is done in a hazardous area.

### 9.01 Commissioning checklist

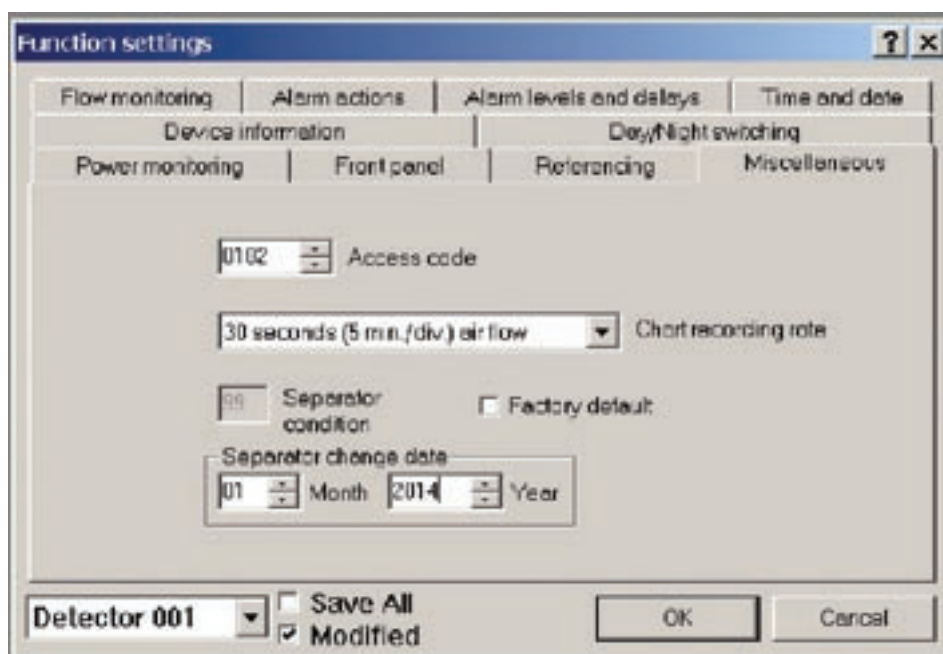


The following brief checklist allows quick setup of the detector. This procedure will be adequate for most standard installations.

1. Before powering up the detector, visually check all cabling and glands to ensure correct connection. If wire identification is not immediately clear (e.g. by use of different coloured wires or wire identification sleeves) an electrical check should be made. **Important Note - Any damage caused by mis-connection of the detector is not covered by warranty.**
2. Power up the unit and connect to a PC and set the address switches on the detector board (See section 7.01) and APIC board if applicable (See section 7.03).
3. Verify that the time and date are correct (See section 3.01)
4. Set an appropriate ClassiFire Alarm Factor for the protected environment. The detector will perform a FastLearn for the new alarm factor. (See section 3.07)
5. Whilst the detector is still in FastLearn mode set the detector into **demonstration mode** (See section 3.10).
6. If a PC is being used to program the detector, remove the serial lead from the port and securely tighten the screw-down protective cover, locking it in place with the lid-locking set-screw. **NB: Air-flow faults should be expected at this stage, as the air path is incomplete.**
7. Wait for the FastLearn to finish and the OK LED indicator to stop flashing. Perform any necessary smoke tests, ensuring that the detector reacts appropriately and let the smoke fully dissipate. **NB: Aerosol canister type synthetic smoke sources should not be used to test the response of the detector as these may leave residue which could cause damage to the unit.**
8. Power down the detector and power back up, so that it enters another FastLearn, this time not putting the detector into Demonstration Mode. The detector will generate no alarms during the 15 minute FastLearn period, and after this the detector will operate at a reduced sensitivity for 24 hours whilst ClassiFire acclimatises to the protected environment and sets up appropriate day and night sensitivity settings.

## 10. Maintenance

Stratos-Ex is a very low maintenance detection system. If required, external cleaning of the unit should be performed using a damp (not wet) cloth. Do not use solvents. The only part that may require field replacement during servicing is the dust separator assembly. The dust **Separator condition** can be reviewed under the **Miscellaneous** tab of the remote software **Function settings** screen (See section 3.33, also shown below) which gives a percentage reading of dust separator efficiency. When this level drops to 80% the detector will signal a fault and the dust separator will need replacing. Alternatively a **Separator change date** may be entered under the **Miscellaneous** tab of the **Function settings**. On the designated date a **'Separator change'** fault will be signalled, in this configuration a separator replacement can be made to coincide with other planned maintenance of the Fire Alarm system. This feature would typically be used in particularly hostile environments where an increased frequency of separator changes is required.

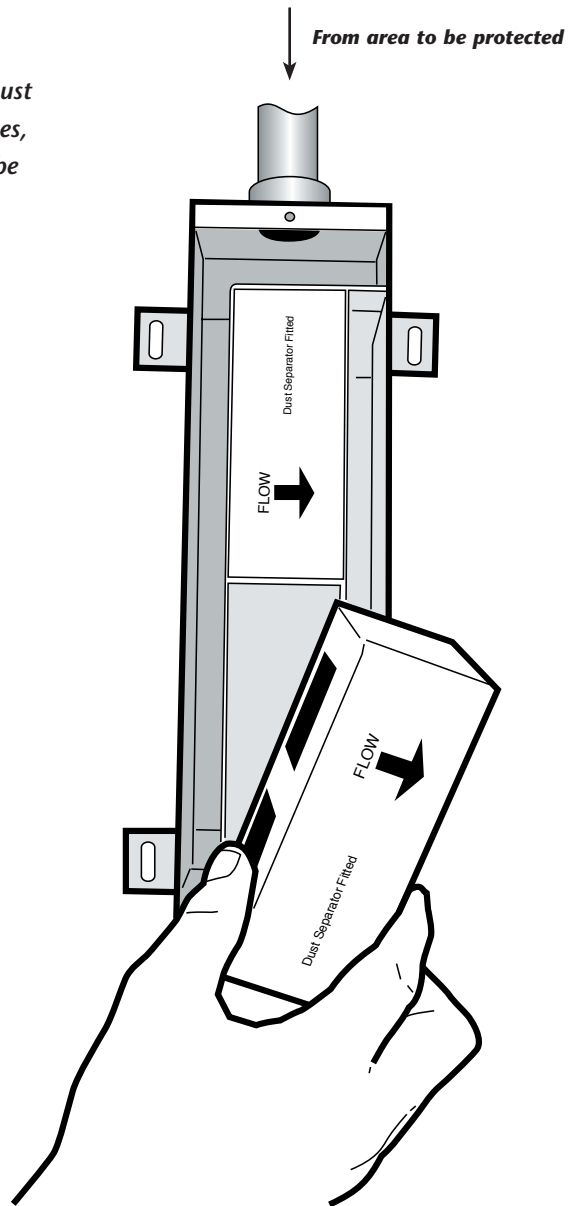


*All necessary safety precautions regarding the specific area should be implemented before proceeding further, if you are unsure of these please consult the site safety officer.*

To replace the filter, remove the front cover of the remote filter housing and pull the filters out. Slide the replacement filters in so that the 'Direction of flow' arrow printed on the carton duplicates that shown on the diagram overleaf and replace the front cover.

As dust contained in the dust separators may expose maintenance personnel to a 'nuisance dust' hazard as defined by the 'Control of Substances Hazardous to Health' (COSHH), it is strongly recommended that suitable masks and protective clothing be worn when changing filters. *Used separators are not intended for re-use and should be safely disposed of.*

*Important Note -  
After fitting new Dust  
Separator cartridges,  
a FastLearn must be  
initiated  
(See section 3.07).*

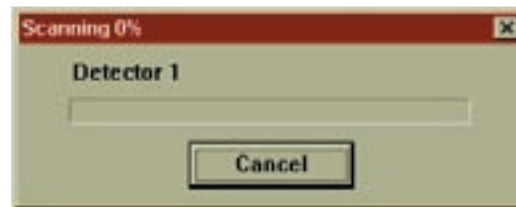


## 10.01 Diagnostics

The remote control software includes a diagnostic function which carries out a number of checks to verify the correct functioning of the detector. A good time to run these tests is as a part of planned maintenance. To call up diagnostic mode, select the menu options “View ▢ Diagnostics” or click on the symbol indicated below.

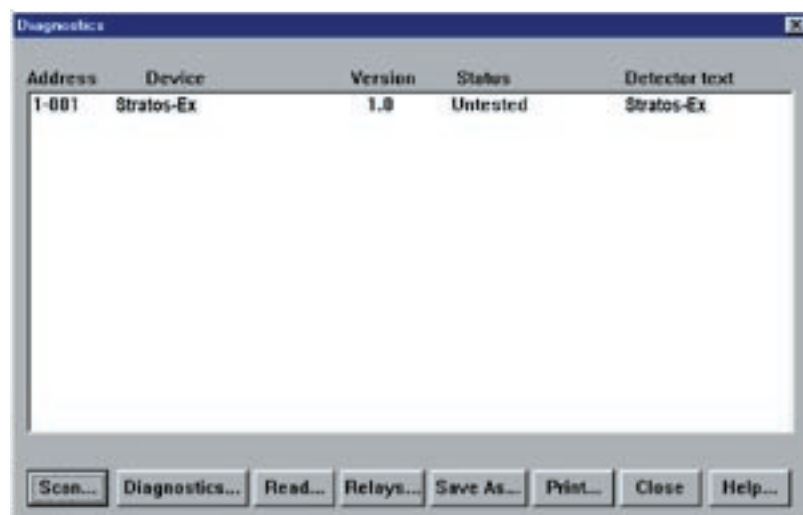


The following message will then appear on the screen:



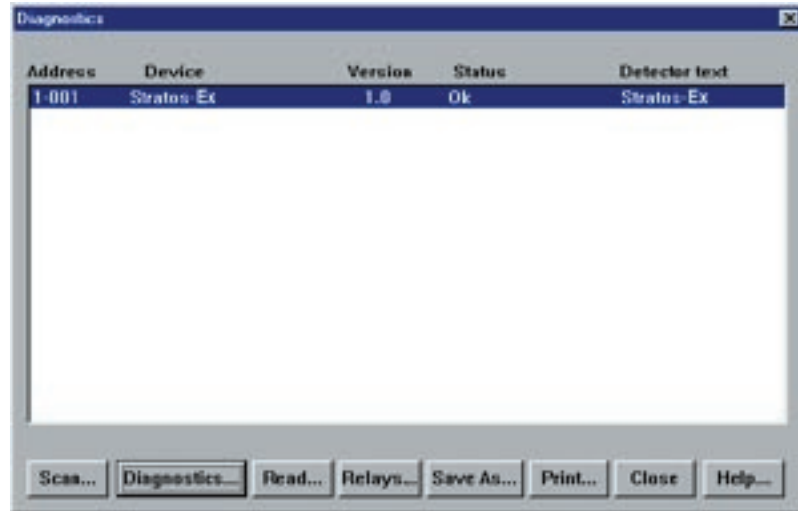
The software will then scan the loop for up to 127 detectors. For a single detector, wait until the first detector has been identified and the window indicates that it is scanning for Detector 2, then press the Cancel button.

The following window appears:



Click on the list entry to highlight it and click on the “Diagnostics...” button. The software will then commence the system tests. During the “Aspirator and flow” test, the aspirator will suddenly slow down, but this is a normal part of the test and no cause for alarm.

When the test has finished and no problems have been found, the following screen appears:



If any problems were found during the diagnostic tests, the nature of the fault will be indicated in the "Status" column.

- Scan:** Reads in the status of all connected detectors.
- Read Button:** This brings up a display of the detector output and flow rate which updates in real time.
- Relays:** Brings up a screen allowing the function of the volt-free 'Fire' and Fault LEDs to be tested with the aid of a continuity meter or other tester. The Fire relay contacts are open in normal operation and will close on test. The Fault relay contacts operate on a 'Fail-safe' basis and are held closed in normal operation. They will therefore open on test.
- Save As:** Saves the summary list of scanned detectors and their status as a text (.txt) file.
- Print:** Prints the summary list to a connected printer.

## 11. Troubleshooting

### 11.01 Nuisance alarms occur too often

- Check that the ClassiFire alarm factor setting is appropriate for the normal working environment of the protected area. (See section 3.05).
- Check that the detector is not in Demonstration mode. This can be ascertained by viewing the event log (See section 8) and checking that the entry **Demo mode** has a higher log entry number than the most recent **FastLearn start** and **FastLearn end** entries. Remember that the log entries are in reverse order, with the most recent entries appearing first. If the log shows that Demonstration mode was invoked during the last FastLearn period, start a new FastLearn and allow it to complete its 24-hour cycle. (See section 3.07)
- From the event log (See section 8), check that 24 hours have elapsed since the last **FastLearn end** entry.
- Check that day-night switchover times are appropriately set to reflect active and non-active periods (See section 3.11).

### 11.02 Elevated smoke levels do not generate alarms

- Check that detector is not Isolated or in FastLearn (if Isolated, the **Fault** light will be illuminated)
- Check that the detector sampling points are in the smoke stream
- Check that the correct ClassiFire alarm setting has been set (See section 3.05)
- Check that the detector has either had a 24 hour learning period or that it has been placed in Demonstration Mode

### 11.03 Low mean output

- Check that the filter does not require changing (See section 10) and that the filter chamber is clean. The chamber may become clogged when, for example, heavy building activity has occurred near the sampling pipes.

### 11.04 Detector sensitivity varies over time

- There are many reasons why smoke densities may vary, and the ClassiFire system automatically compensates for this in order to reduce the likelihood of nuisance alarms due to normal variations in background smoke density, within limits set by the ClassiFire alarm factor. This is a normal part of the detector's working.

### **11.05 Flow fault errors**

- These occur when the airflow rate into the detector is outside the pre-programmed limits. As the detector 'learns' the flow setup from the initial installation, this usually means that there has been some change in conditions. A **Flow high** fault may indicate that a sampling pipe is damaged, and a **Flow low** fault may indicate that the pipe or filter has been blocked.

#### **11.05.1 'Low flow' error messages**

- Check that the pipe or filter is not blocked.
- Check that the low flow fault threshold is not set too high (See section 3.29).

#### **11.05.2 'High flow' error messages**

- Check that the pipe is screwed home into the flame arrestor and is not broken or cracked.
- Check that installed pipe-work is fitted with an end-cap. AirSense Technology PipeCAD™ pipe modelling software prompts the use of appropriate end-caps. **Open bore pipes are not recommended.**
- Check that the high flow fault threshold is not set too low (See section 3.28).

## 12. Do's and Don'ts



### DO

- Ensure that the ClassiFire alarm factor is appropriately set.
- Ensure that cables are correctly connected before powering up by use of cable identifiers or electrical continuity checks. Incorrect connection could damage the detector.
- Ensure that cable of an appropriate approved type is used for interconnection.
- Place sampling points so that the detector will be able to detect smoke at the earliest opportunity.
- Ensure that the detector exhaust is in an area with the same atmospheric pressure as the sampling pipes, either by placing the detector physically in the protected area or by leading a pipe from the detector exhaust to the protected area.
- Ensure that the environment of the protected area is within the environmental operating parameters of the detector (**temperature -10 to +60°C, humidity 0-90%, non-condensing**). Set the Detector Address Switches correctly when used in a network.
- Set the detector address switches correctly if the detector is part of a network.
- Ensure that all hazardous area safety rules are followed and correct permits to work obtained.

### DON'T

- Remove or connect boards when the detector is powered up.
- Connect internal 0 volt terminals to local earth.
- Attempt to re-use dust separator cartridges once removed.
- Attempt to adjust or alter detector settings other than via the user-programmable functions. In particular, the setting up of the laser is a precision task, and once set up the potentiometers should be left alone. If it is suspected that the laser alignment has shifted (e.g. after dropping the detector), it should be returned to AirSense for recalibration.
- Place the detector near high power RF sources.
- Test the response of the detector using aerosol canister synthetic smoke.

### 13. Stratos-Ex Technical Data

SELV rating (EN 60950)	Class III
Supply Voltage	21.6V - 26.4V DC PSU Type: conforming to EN 54-4 Electrical safety complies with BS EN 610190-1
Explosion-proof housing	 II 2 G EEx d IIB+H2 T3 (Tamb -20°C to 45°C)  II 2 G EEx d IIB+H2 T2 (Tamb -20°C to 60°C)
Size (mm) excluding cable glands	400W x 200H x 180D inc. breathing devices
Cable entries	Up to 4 x M20
Weight	8.5kg
Housing material	Aluminium LM25 Stainless Steel (ASTM 316) - option
Operating temperature range	0 to +38°C (UL268) -10 to +60°C (CEA4022)
Operating humidity range	0 - 90% Non Condensing BS EN 61010-1 Pollution degree 1 BS EN 61010-1 Installation Cat. II
Sensitivity range (%Obs/m)	Min = 25% Max = 0.03% FSD
Maximum sensitivity resolution	0.0015 % obs/m
Detection principle	Laser light scattering mass detection
Particle sensitivity range	0.0003µm to 10µm
Current consumption	0.65A
Relay contact rating*	10VA (30V max. or 0.5A max.)
Maximum sampling pipe length	50m
Sampling pipe inlets	1
Sampling pipe internal diameter	20 - 25mm
Alarm levels	4 (Fire 2, Fire 1, Pre-Alarm and Aux) 1 relay as standard, others available
Chamber service intervals	Greater than 8 years (depending on environment)
Dust separator replacement intervals	Greater than 2 years (depending on environment)
Programming	PC via RS232/RS485
Data bus cable	RS485 data cable
Data bus length	1.2 km
IP rating	IP50

\*Devices, such as local sounders and beacons can demand high in-rush currents, which may damage the relays. If relays are used to drive the device directly, a suitable 47 ohm current-limiting resistor should be placed in series with the load.

**NB** □ This equipment is only to be used in accordance with this specification. Failure to operate the equipment as specified may cause damage to the unit.

## Certification and Standards

The Stratos-Ex series has been certified according to:

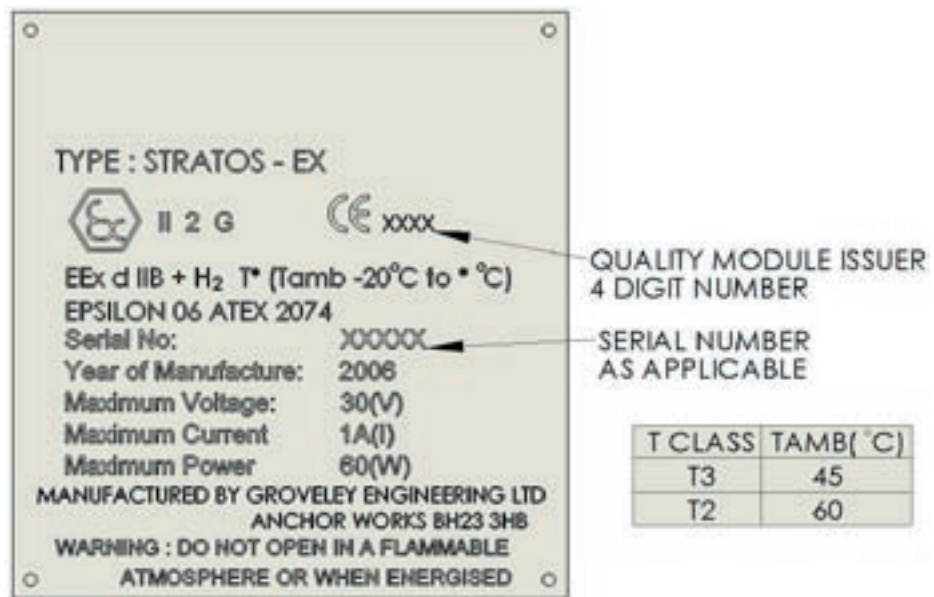
ATEX Directive 94/9/EC and the requirements laid down by the following standards:

EN 50014: 1997 incl A1 + A2	Electrical apparatus for potentially explosive atmospheres. General requirements.
EN 50018: 2000 incl A1	Electrical apparatus for potentially explosive atmospheres. Flame-proof enclosure 'd'



### Certificates

- ATEX Certificate: EPSILON 06 ATEX 2074 (Stratos-Ex)
- ATEX Certificate: EPSILON 06 ATEX 2138U (Knitmesh Arrester)
- ATEX Certificate: DEMKO 02 ATEX 133173U (GD-JB-8000 Flameproof Enclosure)

### Product identification label



TYPE : STRATOS - EX

 II 2 G  XXXX

EEx d IIB + H<sub>2</sub> T\* (Tamb -20°C to \* °C)  
EPSILON 06 ATEX 2074

Serial No: XXXXXX

Year of Manufacture: 2006

Maximum Voltage: 30(V)

Maximum Current: 1A(I)

Maximum Power: 60(W)

MANUFACTURED BY GROVELEY ENGINEERING LTD  
ANCHOR WORKS BH23 3HB

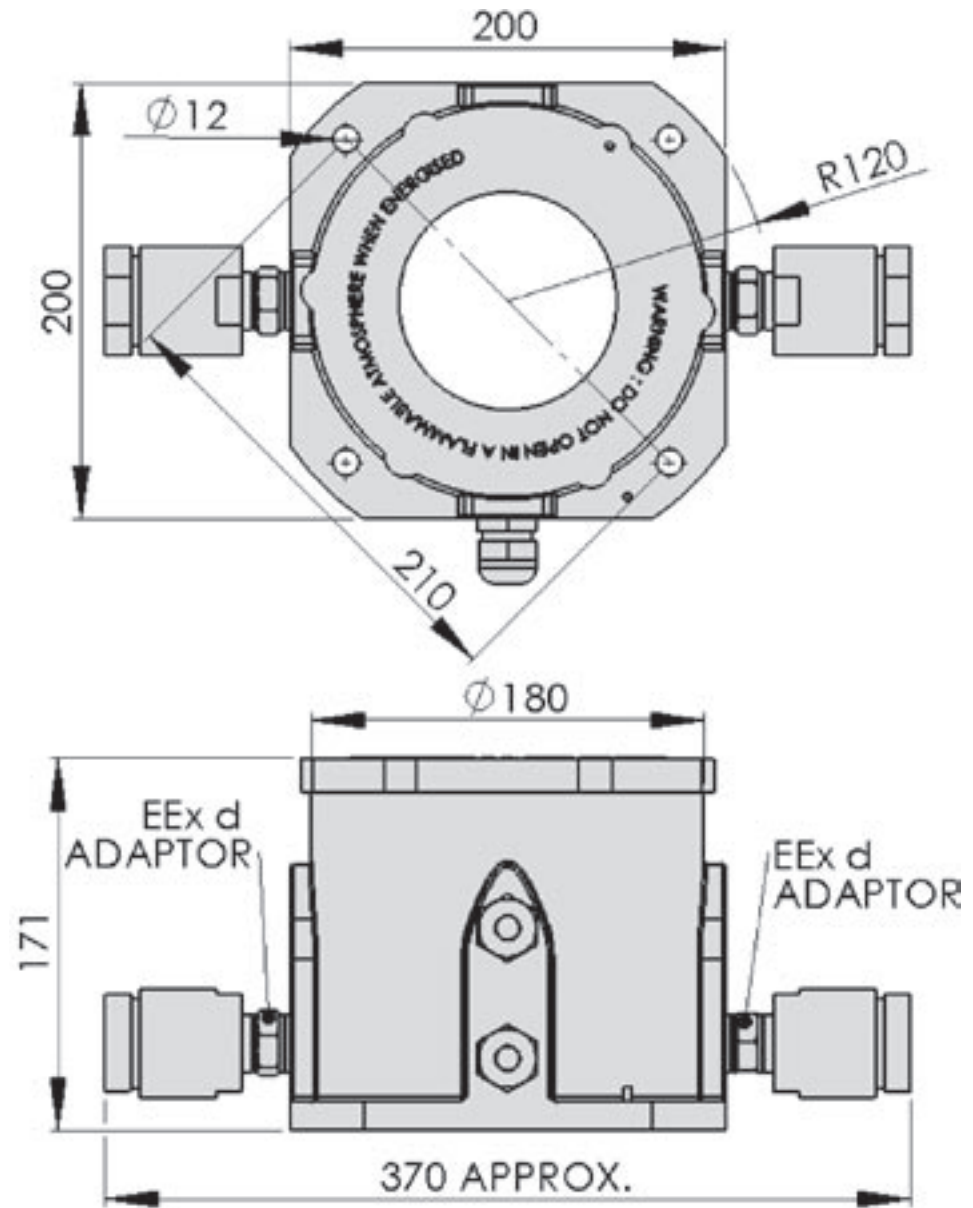
WARNING : DO NOT OPEN IN A FLAMMABLE  
ATMOSPHERE OR WHEN ENERGISED

QUALITY MODULE ISSUER  
4 DIGIT NUMBER

SERIAL NUMBER  
AS APPLICABLE

T CLASS	TAMB( °C)
T3	45
T2	60

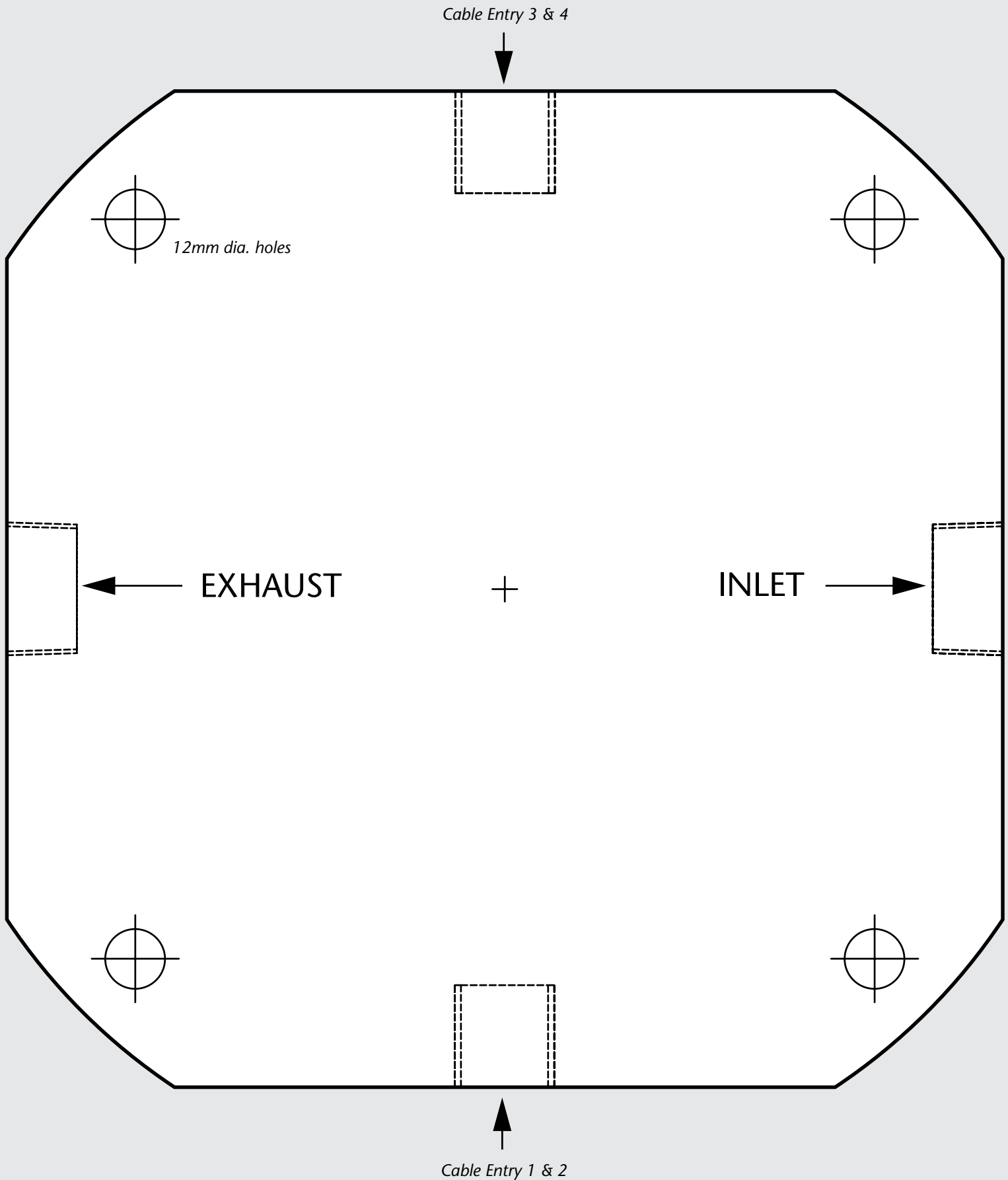
### Stratos-Ex Identification label



**Stratos-Ex outline dimensions (mm)**

## Stratos-Ex Template

NB: Print this page 100% size, and not 'shrink over sized page', pdf default





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