Stratos Micra 100

High Sensitivity Smoke Detector

Fire

Fault

OK

Introduction

Stratos-Micra 100® 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, while optimising performance.

Stratos-Micra 100 incorporates a patented 'artificial intelligence' known as ClassiFire®, which allows the detector to configure itself to optimum sensitivity, alarm thresholds and minimum nuisance alarms for any environment.

ClassiFire intelligence 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 range of detectors is 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.

The Stratos range of detectors has proven its 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 111 as defined in EN60950 (i.e., this equipment is designed to
operate from Safety Extra Low Voltages and does not generate any hazardous voltages).

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

CE 0832

Kidde Products Limited
Unit 2 Blair Way Dawdon
City: Seaham, County Durham
SR7 7PP, UK
09

0832-CPD-0982

EN54-20: 2006

Aspirating smoke detectors for fire detection and fire alarm systems for buildings

Class A, B and C

Technical data: see INF48029 held by the manufacturer

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 the board.

LASER CLASS 1 PRODUCT

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.

This symbol indicates the Safety Earth stud (see section 6.2.1). This is for grounding cable screens and should not be connected to 0V or signal earth.

HELP LINE
(+44) (0) 1844 265004

*Kidde Products Ltd. has taken every care to ensure that Stratos-Micra 100 is as simple to install as possible but in case of difficulty, please contact our **Help Line** to ensure trouble free installation and operation.*

Kidde Products Ltd. takes no responsibility for damage or injury occasioned as a result of failing to install or operate the equipment in accordance with these instructions.

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.

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 about its environment.

2. Inside the Detector

2.1 Interior view

Direction of flow

DIRECTION OF FLOW

LASER CLASS 1 PRODUCT

HIGH EFFICIENCY ASPIRATOR
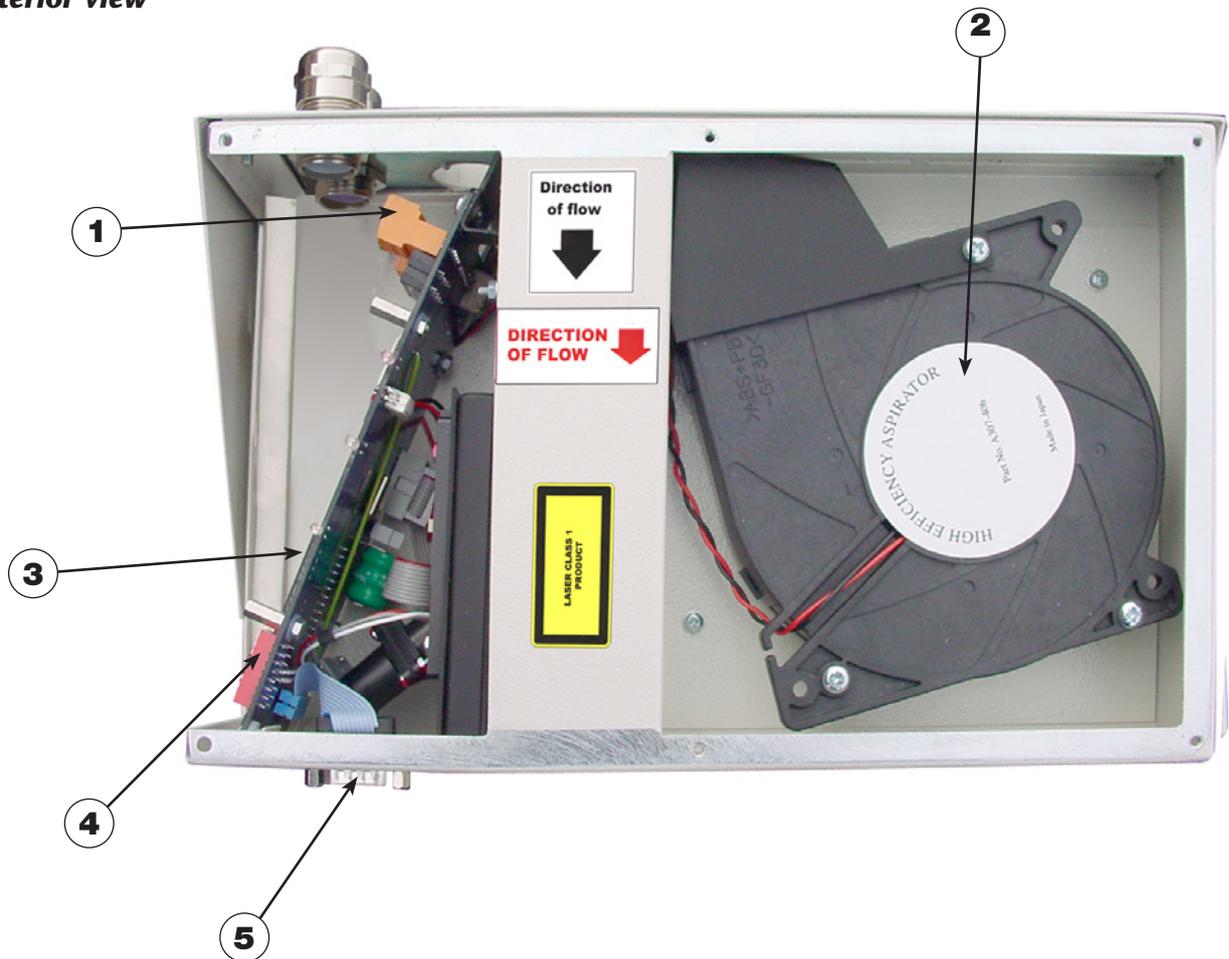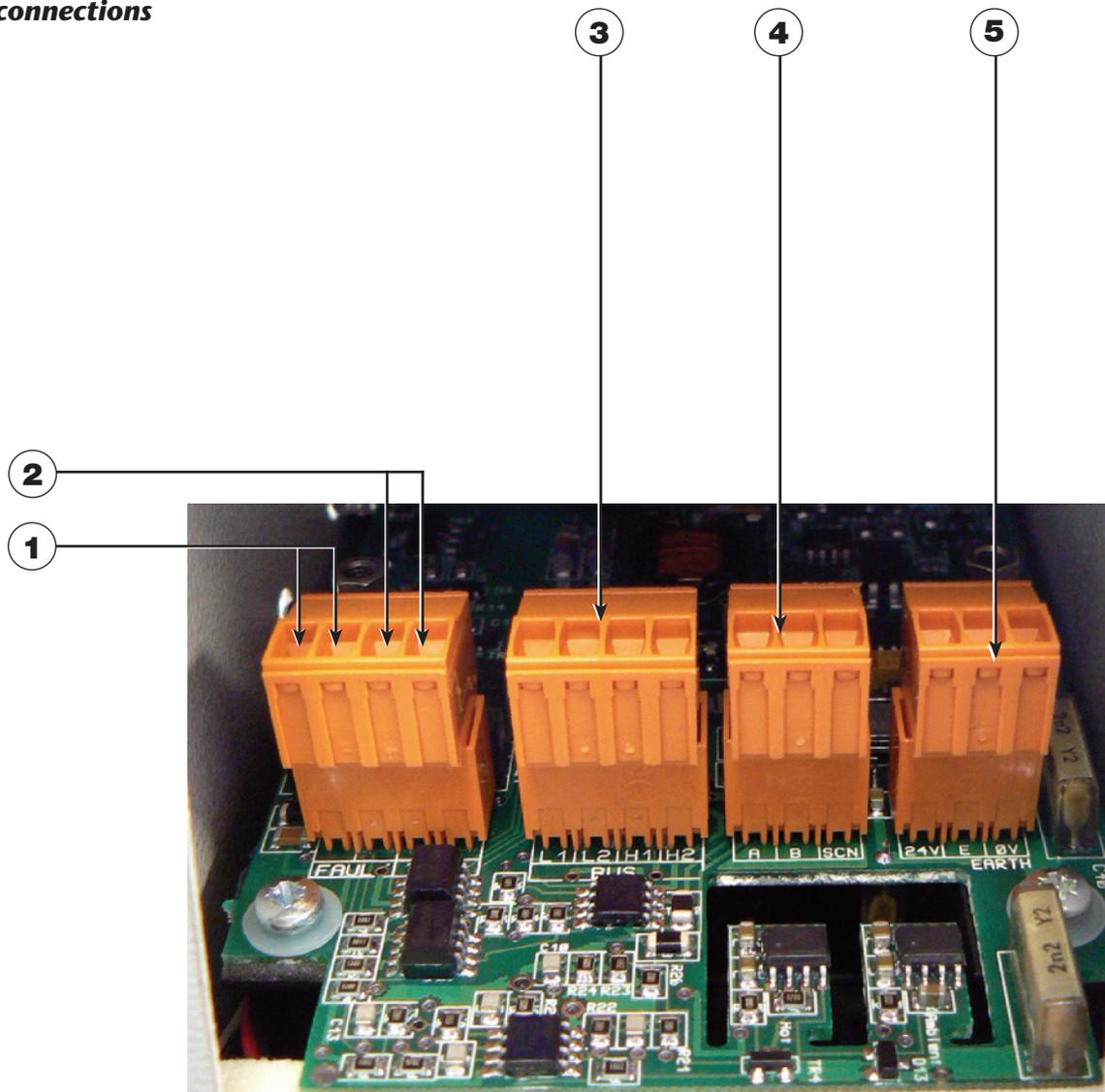
1. Removable terminal blocks (see section 2.2)
2. Filter (see section 10)
3. Addressable bus interface card (APIC) port (see section 7.3)
4. Detector address DIP switch (see section 7.1)
5. RS232 serial port (see section 7.4)

## 2.2 Detector terminal block connections

1. FAULT relay contacts (Open = FAULT)
2. FIRE relay contacts (Closed = FIRE)
3. APIC addressable bus connections for use in conjunction with interface card (see sections 6.2.2 and 7.3)
4. RS485 / SenseNET connections (see sections 6.2.2 and 7.2)
5. Power supply connections (see section 6.2.1)

3 Programming the Detector

The Stratos-Micra 100 may be programmed from a PC when connected to the detector via a standard 9-pin serial lead connected to the serial port of the computer and the 9 way socket at the base of the detector (**see section 7.4, 'Connecting to a PC'**). 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 disk supplied with each detector. Install the software in accordance with the on-screen instructions. To open the software, select "Start ➔ Programs ➔ AirSense ➔ Remote *x*" (where *x* is the version of software installed). Access the drop-down list to the right hand side of the toolbar. This defaults to "Detector 001". Scroll down this list to select the detector number corresponding to the connected detector's address number if the address is other then the factory default setting of 1 **(see section 7.1)**.

The programmable functions are all accessed though the "Options ➔ Detector settings" submenu or by clicking on the detector symbol in the remote software toolbar as indicated below.
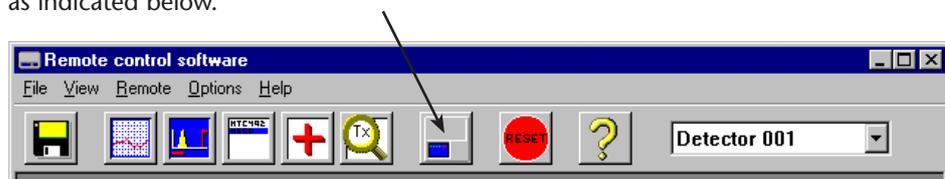
The software will display a prompt for the detector's access code **(see section 3.33)**. The default access code is 0102. When the correct code is entered, the programmable functions may be accessed and amended as required.

The following screen appears.
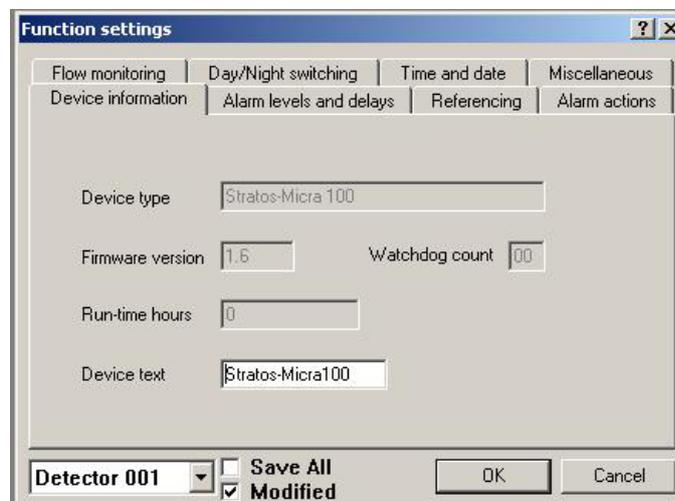
This window contains all the programmable functions for the Stratos-Micra 100.

To amend 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.

NB ☞   **NB: Users should be aware that using settings other than those given in section 5.2 may alter the performance of the detector from that tested for EN54-20 or UL238.**

3.1 Time and date – `Time and Date` *tab*

It is important that the time and date be set up correctly on the controller'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. This is backed up with a rechargeable battery. Later adjustments to the clock setting should not exceed ± 70 minutes unless a FastLearn is initiated

3.2 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 % obs/m.
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.

3.3 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 sensed 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.

3.4 ClassiFire® override - `Alarm levels and delays` *tab*

Note: This function is only available via the optional Input/Relay Card. This board is fitted in the same manner as an APIC card (see section 7.3). Only a single expansion port is available, so an APIC card cannot be fitted at the same time as an Input/Relay card.

This function is used to temporarily decrease the sensitivity of the detector by a known amount to prevent nuisance alarms generated by planned events, e.g., opening furnace doors or incense burning during church services.

When this function is set to a value other than zero, the shorting together of the "I/P 3" contacts on the Input/Relay Card by means of volt free contacts will desensitise the detector by moving the alarm levels out by the specified percentage: e.g., if the ClassiFire Override level is set to 15 and the normal Fire 1 alarm is at 20%, closing the contacts will change the Fire 1 threshold to 35%.

NB, unlike other remote functions employing the Input/Relay card, a choice of input terminals is not available. This function is dedicated to the "I/P 3" terminals.

3.5 Alarm factor - `Alarm levels and delays` *tab*

The detector sensitivity is set with this entry, 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 is suitable for clean, environmentally controlled environments, e.g. semiconductor manufacturing clean rooms where airborne pollutants are kept to an absolute minimum and the least contamination is cause for alarm.

*Use of this setting in a busy machine shop would lead to relatively frequent nuisance alarms due to the normal variation of atmospheric contamination and a lower sensitivity setting is recommended. **It is therefore important that the 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 reduced to an absolute minimum.*

The following table gives suggested settings of ClassiFire alarm setting for different locations

Alarm Factor	Sensitivity	Probability of Nuisance Alarm	
0	Extremely High	Once per year	Semiconductor manufacturing clean room
1		Once per 5 years	Computer room
2		Once per 10 years	Non-smoking office
3		Once per 50 years	Clean factory
4	Medium	Once per 1000 years	Warehouse
5	Medium	Once per 5,000 years	Warehouse with diesel trucks operating
6	Medium	Once per 10,000 years	Warehouse with diesel trucks operating
7	Low	Once per 20,000 years	Warehouse with diesel trucks operating
8	Low	Once per 100,000 years	Warehouse with diesel trucks operating

3.6   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 manufacturing clean rooms, due to the increased probability of nuisance alarms in most other operating environments.*

3.7   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** Kidde Products Ltd.

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

*Note: It will take a further 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 functioning that the detector not be left in Demonstration mode, and that it be allowed to complete the 24-hour learning period. To cancel demo mode, tick this box or power down and restart the detector to initiate FastLearn mode.*

3.8   Auto FastLearn enable - `Alarm levels and delays` *tab*

When enabled, this function will cause the detector to reset its flow thresholds and start a new FastLearn sequence whenever the power is cycled (turned off and then on again). Since the FastLearn process results in reduced sensitivity for 24 hours, there are times when it may be desirable to disable this function, ensuring that the detector retains all its settings when the power is cycled.

It should be noted that when the function is enabled and the power is cycled, it will "learn" the following situations, setting them as nominal:

• Blocked or broken sampling pipes
• Blocked or missing dust separator
• Missing front cover (this will result in flow faults when the cover is fitted)

The function is enabled by default

3.9 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 a rapid increase in smoke density, thereby minimising response time to 'rapid growth' fires. This function would normally only be used where there were long 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 24-hour learning period is bypassed, so that the detector can reach high sensitivity after only the 15 minute FastLearn period. This can be used so that initial smoke testing and other commissioning can be carried out.

However, it must be understood that, since the alarm levels will be based solely upon the sparse data gathered during the FastLearn period, there is a risk of nuisance alarms due to normal variations in ambient smoke levels. For this reason, the detector should not be left in Demo mode for normal use when connected to a fire panel.

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 on the detector. Entries are made in 24-hour format, e.g. **19** for 7pm. Day and night switching is intended so that the detector may automatically select a different sensitivity when the protected area is unoccupied and fewer contaminants are being produced. ClassiFire automatically detects the change in smoke level after the protected area is left, and if the time at which this happens is within + 70 minutes of the programmed switchover time it selects the night-time histogram. This means that changes in time setting, e.g. changing to summer time, may be ignored as the detector will take this into account. The default times for day and night start are 08:00 and 19:00 respectively

Note that if the environment actually becomes more contaminated during the night period for any reason then ClassiFire will adapt to that too, reducing the night-time sensitivity.

3.12 Disable Day / Night switching – `Day/Night switching` *tab*

If day/night switching is not desirable, the **`Disable day/night switching`** box may be ticked to leave the detector permanently in day mode.

3.13 Remote Isolate - `Alarm actions` *tab,* `Remote input` *subgroup*

This function prevents the detector or Command Module from sending alarm notifications to the connected fire panel when the relevant activating terminals are shorted together via volt-free contacts. It may be used during detector maintenance or smoke testing.

When the function is enabled, entering a value of 01, 02 or 03 to the numeric field to the left of the tick-box assigns the "I/P 1", "I/P 2" or "I/P 3" terminals of a connected relay/input card respectively as the activating terminals.

Remote terminals 4 and 5 are retained for future expansion.

When a unit is isolated, the FAULT light will be illuminated on the detector and a fault signal will be sent to the fire panel, Command Module or SenseNET™.

Note: This function is only available via the optional Input/Relay Card. This board is fitted in the same manner as an APIC card (see section 7.3). Only a single expansion port is available, so an APIC card cannot be fitted at the same time as an Input/Relay card.

3.14 Remote Reset – `Alarm actions` *tab,* `Remote input` *subgroup*

This function allows latching alarms or faults (see sections 3.17 and 3.18) to be remotely reset when the relevant activating terminals are shorted together by volt-free contacts.

When the function is enabled, entering a value of 01, 02 or 03 to the numeric field to the left of the tick-box assigns the "I/P 1", "I/P 2" or "I/P 3" terminals of a connected relay/input card respectively as the activating terminals.

Remote terminals 4 and 5 are retained for future expansion.

Note: This function is only available via the optional Input/Relay Card. This board is fitted in the same manner as an APIC card (see section 7.3). Only a single expansion port is available, so an APIC card cannot be fitted at the same time as an Input/Relay card.

3.15 Remote Day/Night – `Alarm actions` *tab,* `Remote input` *subgroup*

This function allows the detector to be manually toggled between day and night operation **(see section 3.3.6)** when the relevant activating terminals are shorted together. It is useful where the protected area is occupied at varying times, allowing the last person to leave the area to activate the switch.

When the function is enabled, entering a value of 01, 02 or 03 to the numeric field to the left of the tick-box assigns the "I/P 1", "I/P 2" or "I/P 3" terminals of a connected relay/input card respectively as the activating terminals.

Remote terminals 4 and 5 are retained for future expansion.

The day/night setting reverts to the previous state when the contacts are opened. The function can be activated by a keyswitch, latching push button or any other device that has volt-free short circuit contacts when activated. NB, enabling the function overrides any day / night switch-over times previously set (see section 3.11).

Note: This function is only available via the optional Input/Relay Card. This board is fitted in the same manner as an APIC card (see section 7.3). Only a single expansion port is available, so an APIC card cannot be fitted at the same time as an Input/Relay card.

3.16 Programmed Isolate – `Alarm actions` *tab*

When this function is ticked the detector will not generate alarms on any fire panel which is connected, e.g. for use during detector maintenance. The "Fault" light will be illuminated on the detector front panel. The isolated condition will be disabled automatically after 7 days if not manually disabled. This function is disabled by default.

3.17 Latching alarms – `Alarm actions` *tab*

When this function box is ticked it requires a reset signal to clear an alarm condition. Reset can be remote (see section 3.14), from the Remote Software (see section 4.1) or from a Command Module.

If unticked, the alarm signal is extinguished as soon as the alarm condition ends. This is the factory default setting.

3.18 Latching faults – `Alarm actions` *tab*

When this function box is ticked it requires a reset signal to clear a fault condition. Reset can be remote (see section 3.14), from the Remote Software (see section 4.1) or from a Command Module.

If unticked, the fault signal is extinguished as soon as the fault condition ends. This is the factory default setting.

3.19 Cascading alarms – `Alarm actions` *tab*

Ticking this function box means that only when the detector has gone into Pre-Alarm does it start counting down the main Fire delay i.e. the time delays on Pre-Alarm and Fire 1 are cumulative. The Aux alarm is not included in the cumulative delay since it may be set to a higher level than either the Pre-Alarm or Fire 1 levels. This function is enabled by default.

3.20 Device type – `Device information` *tab*

This function is for display purposes only. It shows any special designation for the unit, which will normally be **`Stratos-Micra.`**

3.21 Firmware version – `Device information` *tab*

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

3.22 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).*

3.23 Watchdog count – `Device information` *tab*

The watchdog is a circuit built into the detector that restarts the detector in the event of a failure to function properly. This could be as a result of electrical spikes. This count shows the number of interruptions found. The details of each problem can be found in the event log. **See section 8, "Event log" for further details.**

3.24 Device text – `Device information` *tab*

This function can be used to enter a special designation for the units, such as its working area or room number, which will be displayed on a connected Command Module or SenseNET™ system in place of the detector's address number, whenever the detector generates an event such as an alarm or fault. The maximum length (including spaces) is 16 characters.

3.25 Reference detector – `Referencing` *tab*

A Micra detector may use another detector as a fresh air reference. This function is the address of the detector which will be used as the reference.

To set a detector as a reference detector, enter its address as set by its internal DIP switch into this function. This function is disabled by default.

3.26 Reference enable – `Referencing` *tab*

Ticking this box enables the reference for the detector, if one has previously been allocated in **`Reference detector`** **(see section 3.25)** This function is disabled by default.

3.27 Reference level – `Referencing` *tab*

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

3.28　Reference back-off – `Referencing` *tab*

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

3.29　Flow rate – `Flow monitoring` *tab*

This function is for display purposes only, and shows a value corresponding to the current airflow through the detector.

3.30　Flow high limit – `Flow monitoring` *tab*

This value is the level above which airflow needs to increase to trigger a fault indication (which may indicate a loose or damaged inlet pipe).

`Flow low limit` and `Flow high limit` parameters are automatically set up on initial power-up at the end of FastLearn. They can be manually adjusted after that if required.

3.31　Flow low limit – `Flow monitoring` *tab*

This value is the level below which airflow needs to be reduced to trigger a fault reading (which may indicate a blocked pipe).

`Flow low limit` and `Flow high limit` parameters are automatically set up on initial power-up at the end of FastLearn. They can be manually adjusted after that if required.

3.32　Flow fault delay – `Flow monitoring` *tab*

This feature requires the Remote Control Software version 3.2 or later, available to download free on www.airsensetechnology.com

The default flow fault thresholds on the Stratos-Micra 100 are set to meet the stringent airflow monitoring requirements of EN54-20, with a default flow fault delay of 30 seconds. This may lead to unwanted flow faults being generated when local conditions cause short-term variations in airflow. To help alleviate such issues, the flow fault delay is programmable from 30 to 240 seconds. The flow level needs to be above the high flow threshold or below the low flow threshold throughout the delay period for a fault to be generated.

NB: When setting the value of this function, it is important to take into account that the control unit (e.g. fire panel) may not react immediately to a trouble signal being generated by the detector, and this will add to the total fault response time of the system.

The function value must be chosen so that the total time between the detector entering a fault condition and a fault signal being generated by the panel meets the requirements of local or national fire regulations. The maximum allowable response time for EN54-20 compliance is 300 seconds, and that for NFPA 72 compliance is 200 seconds.

As an example: in the latter case, if the flow fault delay were set to 180 seconds (within the limit), but the fire panel did not generate a fault indication for another 25 seconds, the total response time of 205 seconds means the system would not comply with the regulations.

If documented figures are unavailable for the fire panel reaction time, compliance with reaction time regulations may only be verified by post-installation testing.

3.33   Access code – `Miscellaneous` *tab*

This is the access code required to amend programmable parameters. The default code is 0102. Once the appropriate code is entered it may be changed here to any four digit number to limit unauthorised access.

3.34   Chart recording rate – `Miscellaneous` *tab*

This function controls how frequently the detector and alarm level or flow rates are stored in the Stratos-Micra 100'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 grayed section indicates flow rate recording while 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.

3.35 Separator condition – `Miscellaneous` *tab*

The value given at this function is the efficiency rating of the dust separator element in the detector as a percentage of the efficiency of a clean separator. A new element will give a reading of **99** in this function. When the efficiency has decreased to 80%, the Fault indicator LED will illuminate and the event log will show "`Separator renew`". *Note - After fitting a new element, it will be necessary to start a FastLearn to reset the separator condition reading (see section 3.7).*

3.36 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 3.35, "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" for further details.

3.37 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 3.8). This ensures that the flow setups and alarm thresholds are optimised to the detector's working environment after resetting. It should be noted that where a ClassiFire alarm factor other than the default is required for the protected area, this will need to be re-entered. Section 3.5 gives details of the ClassiFire alarm factors.

4. Other remote software features

4.1 Reset

If latching alarms **(see section 3.17)** or latching faults **(see section 3.18)** 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.
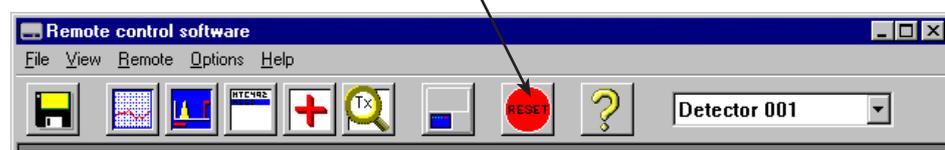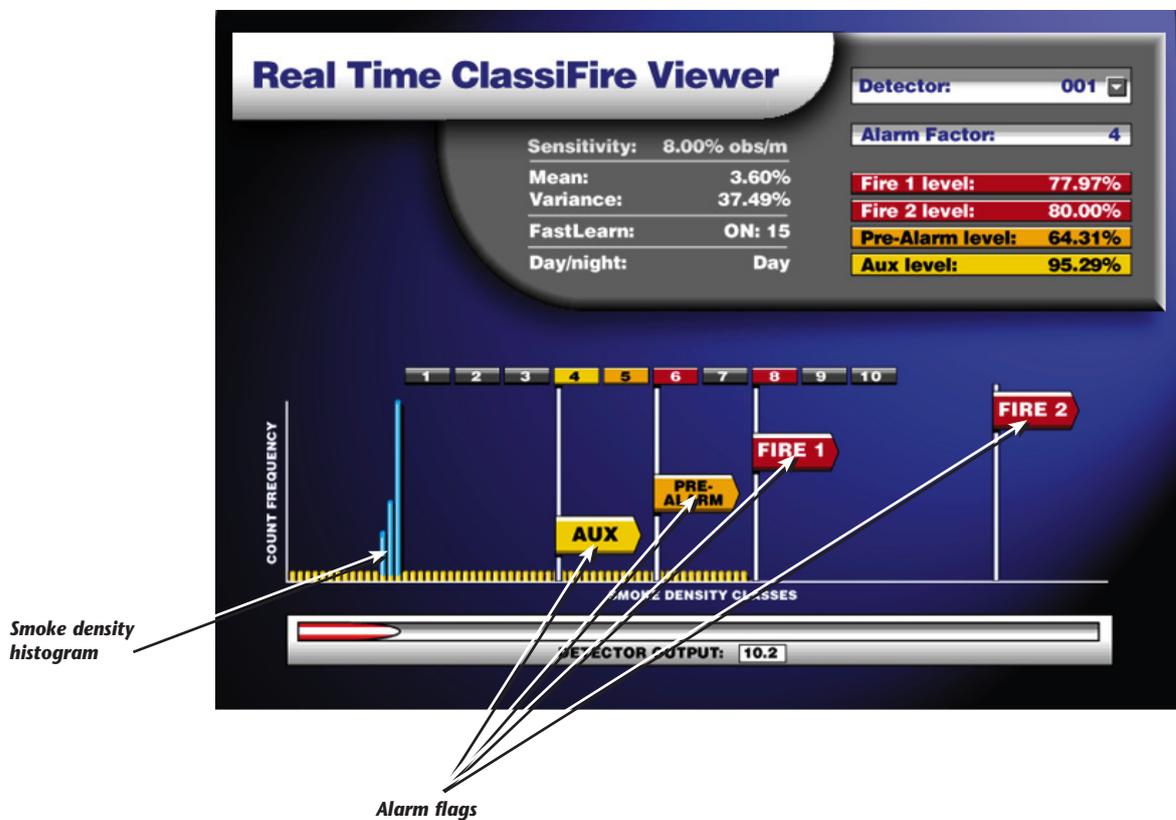
4.2 Histogram screen

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:

Smoke density histogram

Alarm flags

There are two types of smoke density histogram; one shown in blue (the "fast" histogram) which 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 3.7)**. Detector sensitivity is based on the fast histogram during FastLearn and is thereafter based on the currently active slow histogram. However, although the positions of the alarm flags are based on the slow histogram, sudden changes in smoke density are picked up by the fast histogram so that early warning is given.

Sensitivity: The current **absolute sensitivity** of the detector in percentage obscuration per metre (% obs/m)

Mean: The current mean value of smoke density, taken from the currently "active" histogram and given as a percentage of full scale deflection.

Variance: The "spread" of data in the currently "active" histogram and given as a percentage of full scale deflection.

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".

Alarm factor: This is the ClassiFire alarm factor **(see section 3.5, "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.

Detector output: This shows the real-time variation in background smoke levels in terms of a percentage of full scale deflection.
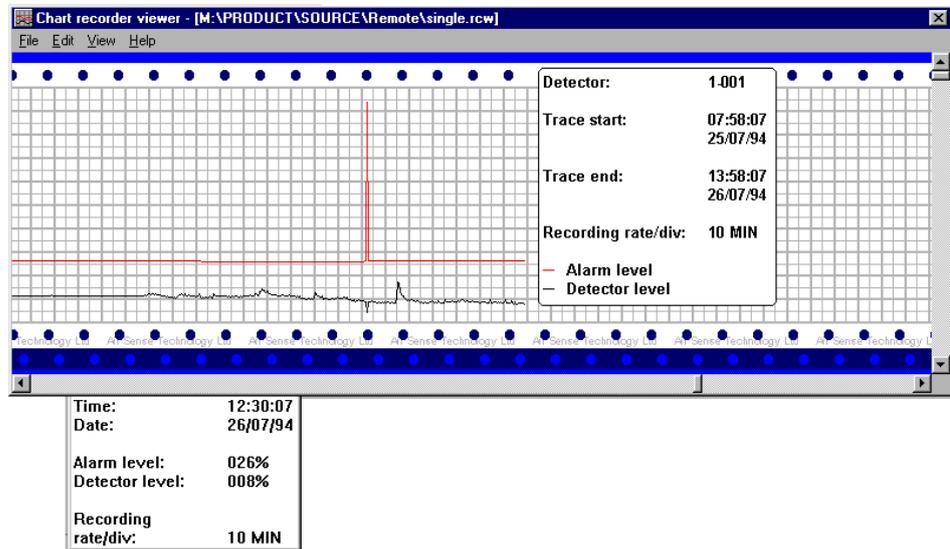
4.3 Chart recording

The chart recording function shows how smoke density in the protected area has 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 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".

4.4 Load / save function settings

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.

Click on the "List files of type" drop-down box and select "Detector settings (*.dfs)" as indicated below.
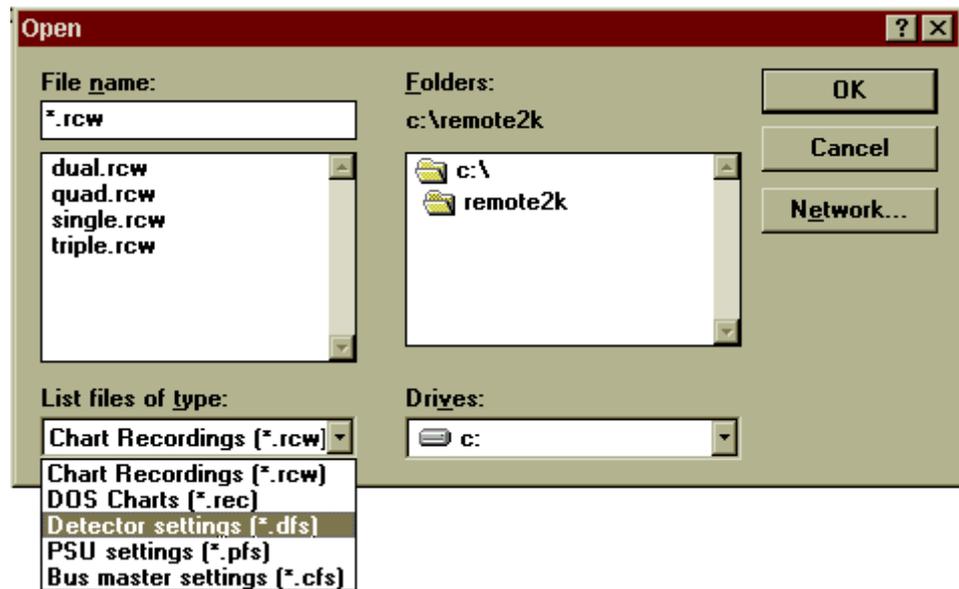
A list will appear of all detector settings files stored on the current drive. As a special case, if desiring to recall the factory default settings, there is a file named 'default. dfs' in the 'remote2k' directory. Loading this file will reset the detector to the factory default.

5. Design Limitations

⚠️

IMPORTANT

Stratos-Micra 100 is intended to provide LOCALISED incipient fire detection only. This means that it is suitable for the substantial range of applications typified by; small non-compartmentalised rooms, warehouse racking, or pieces of electronic or electromechanical equipment where it is desirable to achieve individual incipient fire reporting. In compartmentalised rooms, each compartment would normally use individual Stratos-Micra 100 or Stratos-Micra 25 detectors.

This product employs a very low-power aspirator and the aspirating capability of the Stratos-Micra 100 detector is limited accordingly. Stratos-Micra 100 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-Micra 100 in these circumstances is not recommended. If detection in environments conforming to these descriptions is required, alternative versions of Stratos products should be used.

Maximum length of sampling pipe used with the Stratos-Micra 100 detector is 100 metres in STILL AIR with 25 sampling holes (or Capillary Remote Sampling Points). This will provide a transport time from the end of the sampling pipe within 120 seconds. If the protected area has airflow present, the maximum permitted sampling pipe length will be reduced. In areas or applications where the airflow rate exceeds 1 metre per second, maximum sampling pipe length is reduced to 40 metres.

In order for the installation to conform to EN5420, pipes must conform at least to EN61386-1 Class 1131.
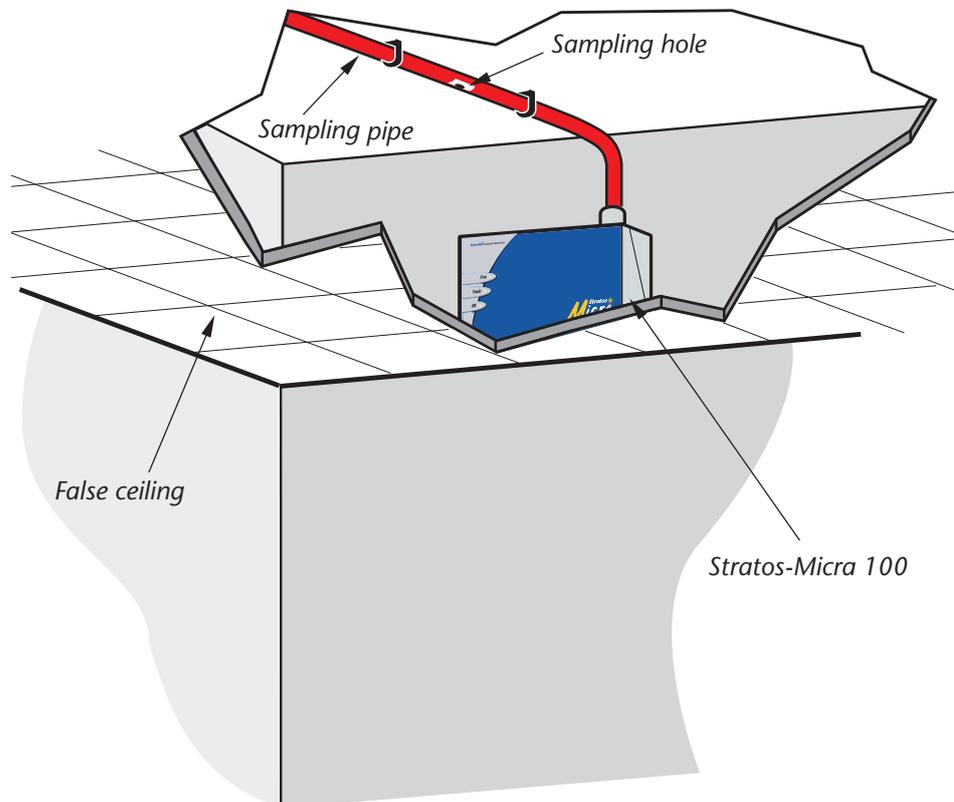
Stratos-Micra 100 is available with an optional 'Piped Exhaust' type Docking Station (see illustration 'A' overleaf). This is primarily intended to allow the detector to sample from areas which may be at different air pressure to the detector location. Typical uses are for air-duct sampling and allowing the installation of the detector in under-floor or ceiling voids or when sampling from pieces of computer related equipment.

(A.) Above ceiling sampling with exposed detector

Note: *The piped exhaust docking station needs to be used in this case.*

Sampling hole

Sampling pipe

False ceiling

Exhaust pipe
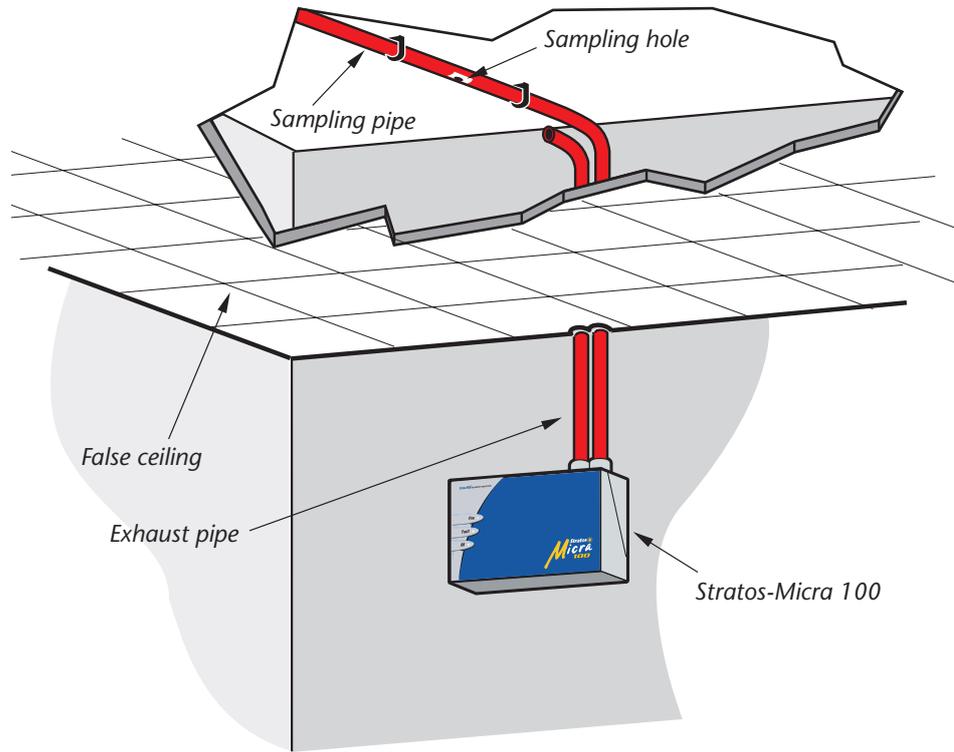
Stratos-Micra 100

Above ceiling sampling with detector mounted in ceiling void

Sampling hole
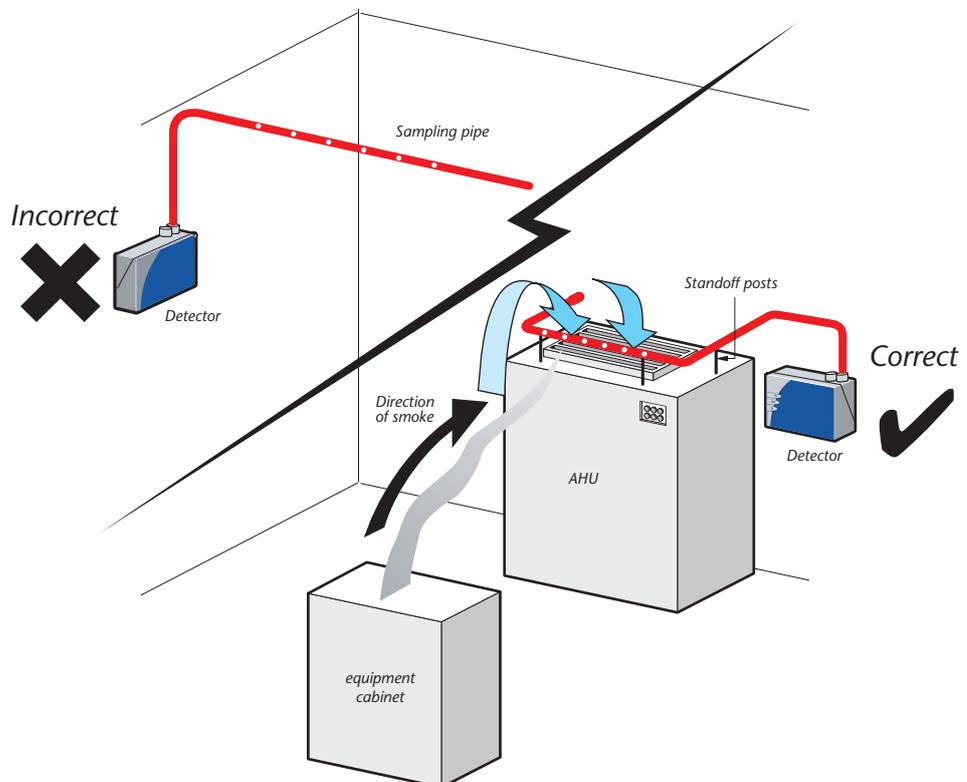
Sampling pipe

False ceiling

Stratos-Micra 100

5.1 System Design

Simple designs with short sampling pipes produce the best results. Complex sampling pipe runs should be avoided with the Stratos-Micra 100 detector. The use of 'T' branch-pipes is not recommended. The Stratos-Micra 100 detector is fitted with two sampling pipe inlets as standard. It is always preferable to use two shorter pipes as opposed to one longer pipe. If two sampling pipes are used, care should be taken to keep the sampling pipe lengths and number of sampling holes on each pipe within 10% of the other. This can be verified using the PipeCAD system design software. Unused sampling pipe inlets should be fitted with pipe bungs.

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 reaching 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.

No more than TWO Air Handling Units may be protected with one Stratos-Micra 100 detector. In this application, ensure that the sampling pipe is raised clear of high velocity air in the immediate vincinity of the air intake grille on stand-off posts as shown below.

Sampling pipe

Incorrect

Detector

Standoff posts

Correct

Detector

Direction of smoke

AHU

equipment cabinet

5.2
EN54-20 and
UL compliance

The installation must be designed using PipeCAD software, which is provided free on the CD shipped with each detector. After designing the installation including pipes, endcaps and sampling holes, enter the detector type. To select the detector type, select Options, select Calculation options, and then select the detector from the Type drop-down list.

5.2.1 EN54-20

Select "Options" "Calculate" or click on the calculator icon. The software will prompt you to choose from "Use set hole sizes" "Best flow balance" and "Max. permissible transit time". Select the appropriate option and click "OK". The results for each pipe ("View" "Results") show calculations for each sampling hole on the pipe with the nearest to the detector at the top of the screen, and the endcap hole at the bottom.

For EN54-20 compliance the transport time of the last sampling hole shall be checked following all installation and proven to be less than or equal to that determined by PipeCAD.

The classification of each sampling device configuration and associated sensitivity settings are determined by the column headed "Hole sensitivity % obs/m" which shows the predicted sensitivity for each hole. For the installation to comply with EN54-20 depending on the class of installation, each sampling hole must be no less sensitive than the following:

Class A: 0.62% obs/m
Class B: 0.62% obs/m
Class C: 0.62% obs/m

The calculation can be further refined by leaving a working detector in the protected area for at least 24hrs at the intended alarm factor for the installation (this could be done before or after installation). The detector sensitivity can be read from the "Sensitivity" figure on the histogram screen of the Remote software supplied with each detector. Click "Options" and then click "Calculation options" to open the "Hole calculation options" dialog box. Enter the sensitivity value obtained from the practical test, and then click OK. The new calculated value will use the the real sensitivity from the practical test.

The PipeCAD software will determine the classification of any used configuration. Commissioning and periodic system tests must involve smoke tests to verify that the system performs as expected and enters Fire 1 alarm within the time determined by PipeCAD from the farthest hole. The detector sensitivity must also be inspected to ensure it has not radically fallen from the installed figure. If it has changed for any reason, the new figure must be re-entered into PipeCAD and the recalculated hole sensitivities must be confirmed to be within the class limits shown above. The settings of a compliant system should be recorded, as it is possible by changing certain programmable functions to make the system non-compliant. If functions are changed, it is recommended that the system is retested if continuing compliance is in any doubt.

5.2.2 UL

UL268 fire tests were passed with an installation as follows:
- Total sampling pipe length: 160 ft (single pipe)
- Number of sampling holes: 10
- Worst-case sampling hole sensitivity as indicated by PipeCAD: 1.28% obs/ft*
- Alarm factor: 1
- Fire 1 alarm delay: 0 seconds

These settings gave satisfactory responses to the test fires in 120 seconds or better. For the purposes of UL268 compliance, these should be regarded as worst case values. Layouts should be planned in PipeCAD and the indicated worst-case hole sensitivity should be better than 1.28% obs/ft*. Commissioning smoke tests should be performed to ensure that the farthest sampling hole from the detector is capable of generating a fire alarm within 120s of receiving smoke.

The results should be verified at installation by entering the installed detector's Fire 1 sensitivity (as indicated in the remote software histogram screen) into the PipeCAD "Options/Calculation options/Detector sensitivity" field and recalculating the layout results.

ULC-S529-02 fire tests were passed with an installation as follows:

- Total sampling pipe length: 302 ft (single pipe)
- Number of sampling holes: 2
- Worst-case sampling hole sensitivity as indicated by PipeCAD: 0.51% obs/ft
- Alarm factor: 8
- Fire 1 alarm delay: 7 seconds

These settings gave satisfactory responses to the test fires in 120 seconds or better. For the purposes of ULC529-2 compliance, these should be regarded as worst case values. Layouts should be planned in PipeCAD and the indicated worst-case hole is more sensitive than 0.51% obs/ft*. Commissioning smoke tests should be performed to ensure that the farthest sampling hole from the detector is capable of generating a fire alarm within 120s of receiving smoke.

The results should be verified at installation by entering the installed detector's Fire 1 sensitivity (as indicated in the remote software histogram screen) into the PipeCAD "Options/Calculation options/Detector sensitivity" field and recalculating the layout results.

6. Installation

Before installing the detector, the local standards 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.

- 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.

- 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 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).

6.1 Docking station

The basic principle behind installation of the Micra is that all wiring and pipe-work is installed using a **docking station**. This is a convenient feature which means that the detector can be dismounted or replaced without disturbing any wiring or installed pipe-work.

There are two types of docking station, one with a single inlet port for aspirating pipe-work, the other with a second port allowing the detector exhaust air to be taken back to the area of different atmospheric pressure from which the inlet is sampling (**see section 4, "Sampling Pipe Design", paragraph 1**).

6.1.2 Mechanical installation

The docking station is connected to the installed sampling pipe-work and fixed to the wall or mounting surface using 3 off screws of a type appropriate to the mounting surface. Ensure that the sampling and/or exhaust pipes are securely seated in the pipe ports before fixing. If using a piped exhaust docking station be sure that the sampling and exhaust pipes are fitted into the relevant ports as shown in section 6.1.

6.2 Electrical installation

The Stratos-Micra 100 detector is supplied with removable terminal blocks **(See illustrations in Section 2.2)**. 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.**
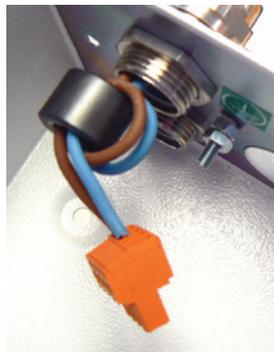
Each detector is supplied with a pair of RF suppression ferrite rings. To ensure compliance with all relevant EMC requirements, the conductors of each cable should be wound once around a ferrite as shown here before entering the relevant connector. Power conductors should be on a separate ferrite, but different forms of signal conductor (e.g. RS485 and relays) can share the same ferrite.

6.2.1 Power supply connections

The power supply cable should be of screened type and should be led through the metal cable gland provided, leaving about 35mm of the cable extending from the bottom of the cable gland. Depending on the type of cable used, it may be necessary to increase the diameter of the cable with sleeving or insulating tape to ensure that the cable is firmly held when the cable gland is fully tightened.
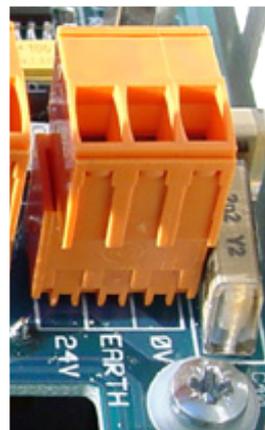

Remove the detector cover by unfastening the four screws at the front of the unit and detach the power supply terminal block. This is on the small fan relay board located at the top left with the detector held with the serial port at the bottom of the unit.
NB, *note the orientation of the terminal block.*
Connect 0V and +24VDC to the "0V" and "24V" screw terminals respectively. Connect the screen wire to the earth stud on the docking station and connect a second wire from the "Earth" terminal to the docking station earth stud. The picture in Section 5.1 shows the location of the earth stud. Fix the earth wires in place with the nuts provided.

6.2.2 Signal connections

APIC address terminals   **RS485/SenseNET terminals**
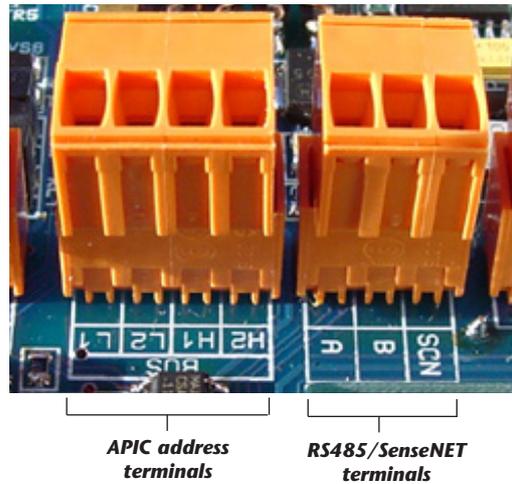
To connect the signal wire, lead a suitable wire type (RS485 cable 9841, 120 ohm screened twisted pair or equivalent) through the second cable gland and tighten it into position with about 35mm of cable from the bottom of the cable gland.

Remove either the three-way terminal block next to the power supply socket if connecting the detector to a SenseNET system, or the four-way "Bus" terminal block if connecting the detector to an alarm panel in conjunction with the APIC addressable bus card **(see section 7.3).** For example, in a SenseNET system using screened cable, connect the screen wire(s) to the "SCN" terminal, Bus A wire(s) to the "A" terminal and Bus B wire(s) to the "B" terminal.

If the detector is in the middle of a SenseNET chain, with input and output connections, it may be more convenient to link the common Bus A, Bus B and screen wires to single A, B and screen wires for linking to the terminal block.

6.3 Final installation

Once the power and signal connections are made, slide the detector body up into the docking station and fasten it into position using the M4 pan head screws provided. 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) and replace the detector cover using the four M3 pan head screws provided.

NB: The detector is designed solely for operation with the front cover securely fitted using all four fixing screws.

Removing the detector is simply the reverse of this process, leaving the pipe-work and wiring connections installed in the docking station.


Dock fixing screws

Cover fixing screws
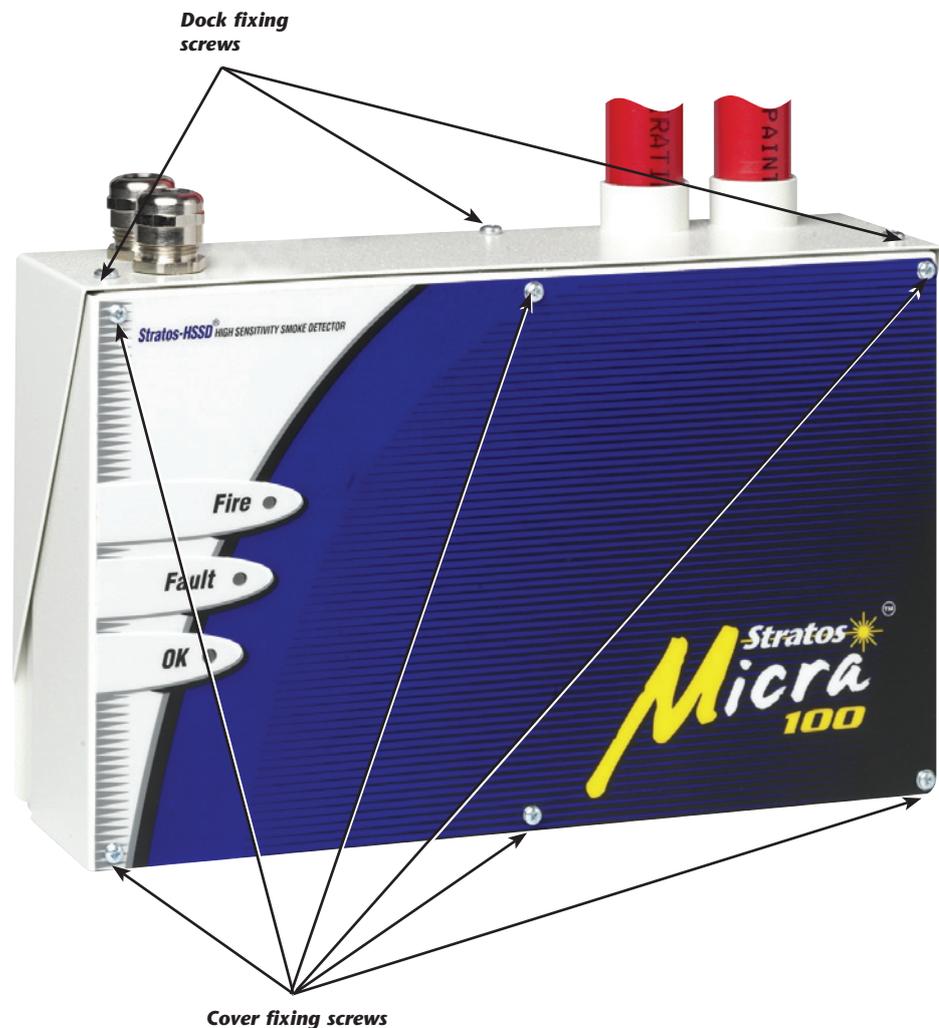
7. Interfacing

Because of the flexible nature of the *Stratos-Micra 100*® detector and the many possible configurations, there are many options for interfacing the detectors to the Fire Panel. These include many third party interfaces available from various manufacturers. 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.

7.1 Setting the detector address

In order to identify itself to the PC Command Module or fire panel, each detector needs to have a unique address ranging from 1 to 127. The detector address is simply set on the DIP switch SW1 at the bottom left 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 (switch 8 equates to a value of 128 and so is outside the usable address range). An example is shown below.
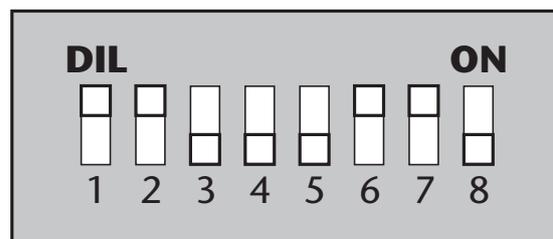
The address equates to 01100011 in binary, or (1 x 1) + (1 x 2) + (0 x 4) + (0 x 8) + (0 x 16) + (1 x 32) + (1 x 64) + (0 x 128) = 99.

The full range of available addresses and their relevant switch settings are in section 7.1.2 for reference.
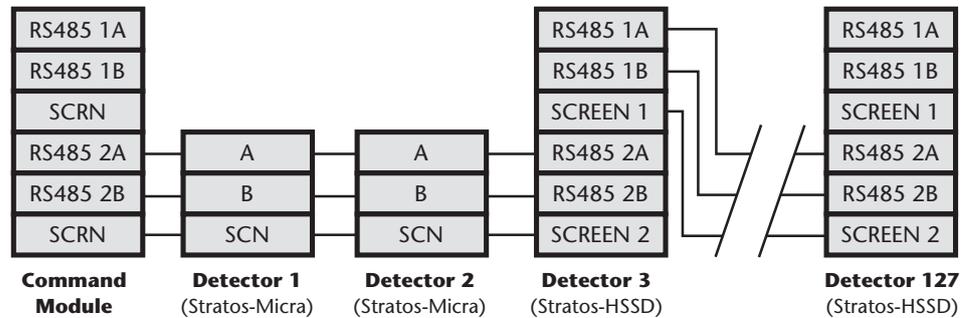
7.1.2 Address table

Addresses chosen for detectors do not have to be consecutive or in a given order so long as they are all 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

7.2 Connecting a Stratos-Micra 100 to a SenseNET/RS485 detector network

RS485 1A			RS485 1A	RS485 1A
RS485 1B			RS485 1B	RS485 1B
SCRN			SCREEN 1	SCREEN 1
RS485 2A	A	A	RS485 2A	RS485 2A
RS485 2B	B	B	RS485 2B	RS485 2B
SCRN	SCN	SCN	SCREEN 2	SCREEN 2
Command Module	**Detector 1** (Stratos-Micra)	**Detector 2** (Stratos-Micra)	**Detector 3** (Stratos-HSSD)	**Detector 127** (Stratos-HSSD)

Up to 127 detectors may be linked in a single SenseNET bus, supporting a total length of wire between adjacent detectors of up to 1.2km.

In the above example, two Stratos-Micra 100 detectors are linked into a 127-detector bus with a Command Module and a number of Stratos-HSSD 2 detectors. It will be noted that whereas the Stratos-HSSD 2 units have two input / output buses (1A / 1B and 2A / 2B), the Stratos-Micra 100 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 2.

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 2 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 2 in the RS485 loop.

In the above example, if detectors 4-126 (not shown) were all of the Stratos-Micra 100 type then the total length of wiring between detectors 3 and 127 would be limited to 1.2km. However, each additional Stratos-HSSD 2 detector wired up using both RS485 buses would allow an additional 1.2km of cabling to be added to the RS485 loop.

7.3 Connecting a Stratos-Micra 100 to an addressable Fire Panel

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

The APIC is fitted to the four mounting studs on the Stratos-Micra 100 PCB using the supplied screws as shown below:
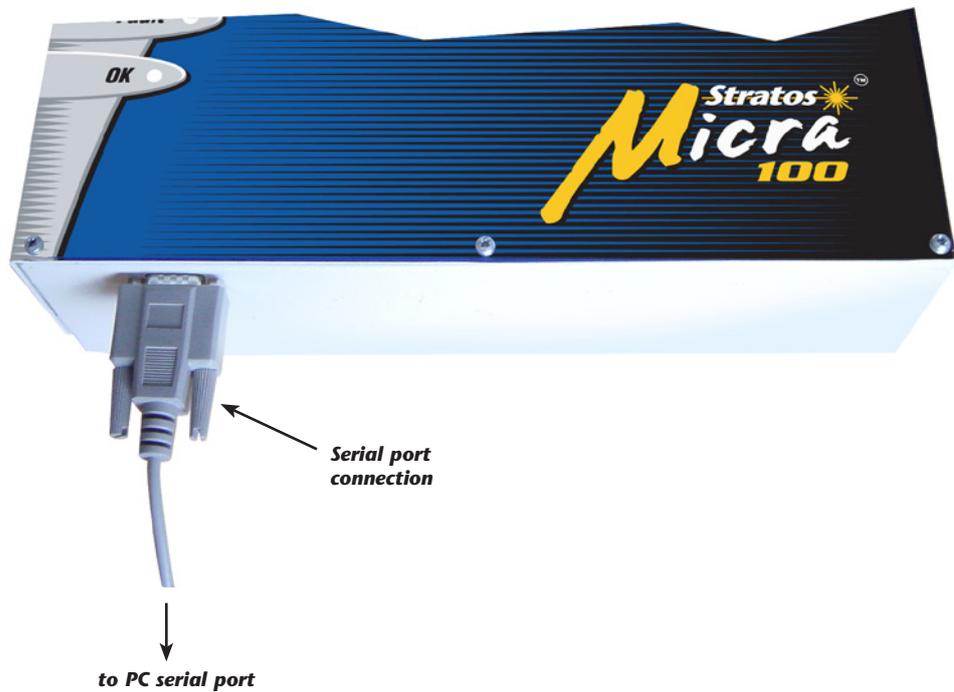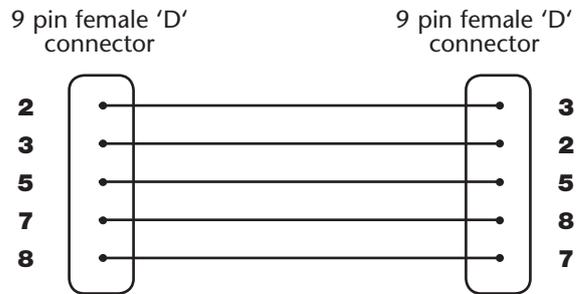

Mounting studs x 4

APIC Address switch x 2

APIC Interface connection
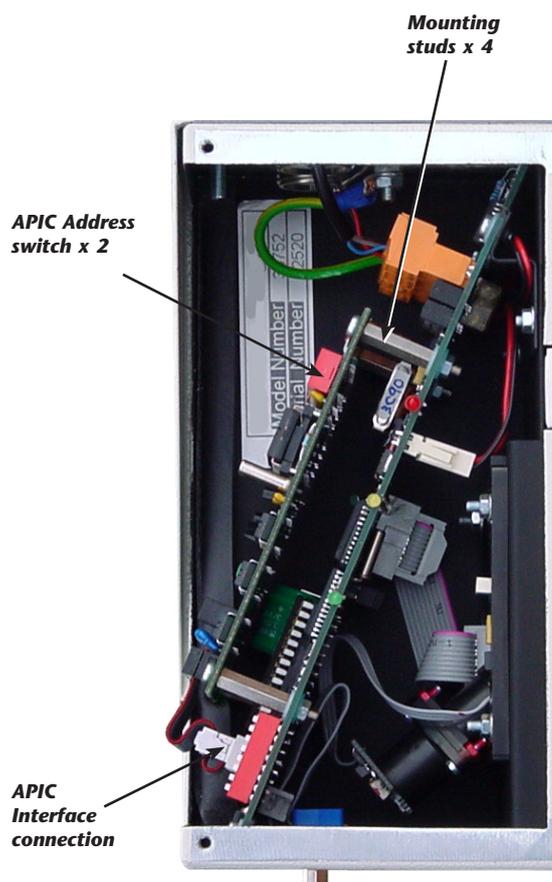
The connections to the Fire Panel are made using the BUS L1 and H1 (bus 1 input and output) and the BUS L2 and H2 (bus 1 input and output) terminal connectors shown in Section 6.2.2.

The only settings that need to be made are on the APIC address DIP switches. The start loop address Is entered on SW1 and the end loop address on SW2. In the case of a single Stratos-Micra 100 the start and end addresses will be the same.

NB: The detector address on the SenseNET loop and the Fire Panel addressable protocol address are the same, i.e. no address translation is performed. Some protocols may not support all the available alarm levels and fault reporting is usually a general fault with no detailed fault information. Please consult the specific APIC protocol documentation for more information.

7.4. 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.

9 pin female 'D' connector   9 pin female 'D' connector

2	3
3	2
5	5
7	8
8	7

Serial port connection

to PC serial port

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
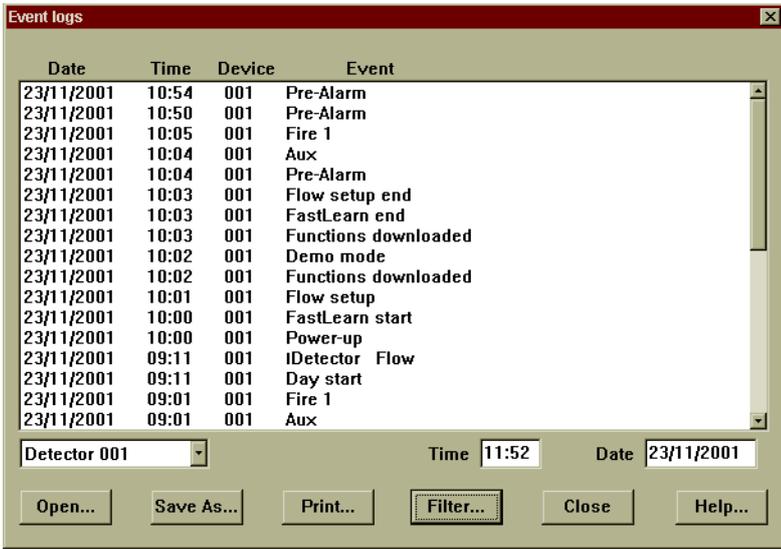- FastLearn start / stop
- Power on or off

The detector stores an internal log of the last 200 events, and this can either be viewed on a PC screen or downloaded to disk 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:

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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 ".evl".

Save As: saves the current event log as a .evl 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:
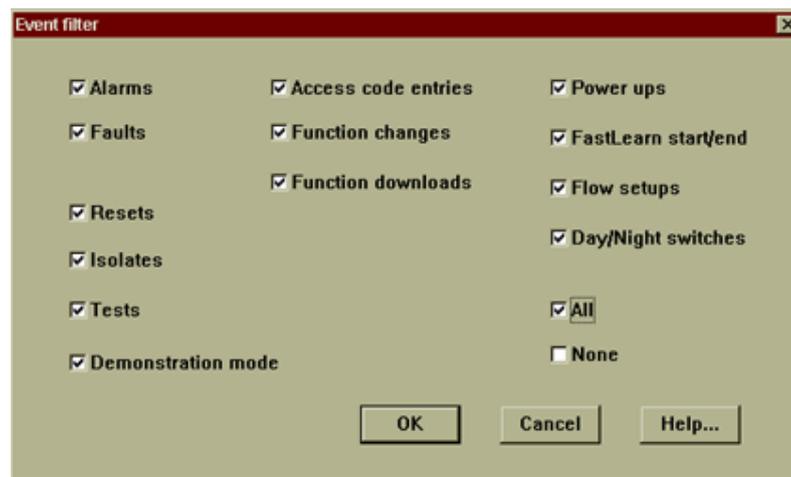
This allows the user to limit the information printed or viewed on the PC screen. For example the user might wish to concentrate on alarm events only. To do this, click on "**None**", which unticks all boxes, and then on "**Alarms**". To tick all the boxes, tick "**All**".

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 widely 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. For instance, the test for a computer room (which should be a relatively clean environment) would be very different from, say, a flour mill, which would probably have a high level of airborne particulate content.

A widely accepted standard for computer rooms/EDP areas is British Standard BS6266, equipment overheating at a stage well before combustion. To perform the test electrically overload a 1-metre length of PVC insulated wire of 10/0.1mm gauge for one minute using an appropriate power supply. The detector has two minutes from the end of the wire burn to give an alarm indication.

For areas with higher levels of background particulate matter testing methodology would be similar to that of standard point detectors.

9.1 Commissioning checklist

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

IMPORTANT NOTE

1. Before powering up the detector, visually check all cabling 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. *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 7.1)** and APIC board if applicable **(see section 7.3).**

3. Verify that the time and date are correct **(see section 3.1)**

4. Set an appropriate alarm factor for the protected environment. The detector will perform a FastLearn for the new alarm factor. **(see section 3.7)**

5. Whilst the detector is still in FastLearn mode set the detector into **demonstration mode (see section 3.10). NB: Aerosol-type synthetic smoke sources should not be used to test the response of the detector as these may leave acidic residues which could cause damage to the unit.**

6. Wait for the FastLearn to finish and the flashing OK LED indicator will finish and perform any necessary smoke tests, ensuring that the detector reacts appropriately, and let the smoke fully dissipate.

7. Perform 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-Micra 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 as these may mar the front panel label. The only part that may require field replacement during servicing is the dust separator assembly*. The dust separator condition can be checked using the **Dust Separator** test in the **Miscellaneous** tab of the remote software '**Detector settings**' screen **(see section 3.33)** 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. To replace the filter, simply remove the front cover and pull the filter out from the main unit. Slide the replacement filter in so that the 'Direction of flow' arrow printed on the carton duplicates that on the 'Direction of flow' label beside the filter slot.

⚠️

IMPORTANT NOTE

It is recommended that dust separators be changed at an interval of not more than 3 years. After replacing the filter, the detector must be put into FastLearn mode (see section 3.7) to reset the filter condition reading.

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 disposed of.

10.1 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.
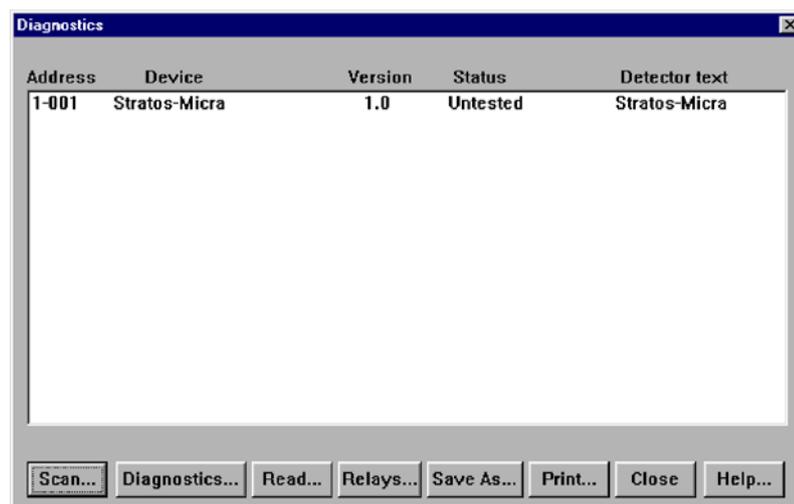


The following message will then appear on the screen:

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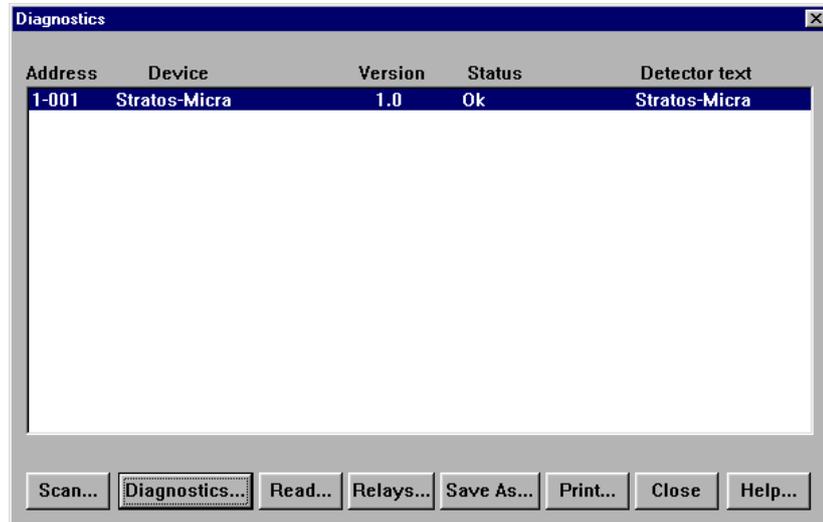
If any problems were found during the diagnostic tests, the nature of the fault will be indicated in the "Status" column.

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

11.1 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 3.5**

- Check that the detector is not in Demonstration mode. This can be ascertained by viewing the event log **(see section 3)** 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 3.7)**

- From the event log **(see sections 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).**

11.3 Elevated smoke levels do not generate alarms

- Check that detector is not Isolated or in FastLearn (if Isolated, the **Fault** light will be lit)
- Check that the detector sampling points are in the smoke stream
- Check that the correct ClassiFire alarm setting has been set **(see section 3.5)**
- Check that the detector has either had a 24 hour learning period or that it has been placed in demonstration mode.

11.4 Low mean output

- Check that the filter does not require changing **(see section 3.35)** and that the air plenum chamber is clean. The chamber may become clogged when, for example, heavy building activity has occurred near the sampling pipes. If so, the chamber may require factory service. The detector is not designed to handle large quantities of coarse debris and dust.

11.5 Detector sensitivity varies over time

- There are many reasons why particle densities may vary, and the ClassiFire system automatically compensates for this in order to replace 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.

11.6 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 has been blocked, e.g. by nearby building operations.

- If the detector input is sampled from one area and the exhaust is in another area with different pressure (e.g. the detector is in a roof space and sampling from an enclosed room), this may lead to flow faults. In this case it would be necessary to lead a pipe from the exhaust to the protected area to ensure normal flow. This will require the detector to be installed using the piped exhaust docking station **(see section 6.1).**

- Intermittent flow faults may indicate local short-term fluctuations in air pressure. To overcome this problem, the flow fault delay is programmable from 30 to 240 seconds.

11.6.1 "Low flow" error messages.

- Check that the pipe giving the error is not blocked

- Check that the low flow fault threshold is not set too high **(see section 3.29)**

- In the case of intermittent fault indications, try increasing the flow fault delay time **(see section 3.32).**

11.6.2 "High flow" error messages

- Check that the pipe is pushed home into the inlet and is not broken or cracked

- Check that installed pipe-work is fitted with an end-cap.
  PipeCAD® pipe modeling 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 3.30)**

- In the case of intermittent fault indications, try increasing the flow fault delay time **(see section 3.32).**

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).**

DON'T

✘ Forget to set the appropriate ClassiFire alarm factor for the area to be detected.

✘ Forget to set the Detector Address Switches correctly when used in a network.

✘ Site detectors in damp or exposed areas.

✘ 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 the manufacturer for recalibration.

✘ Place the detector near high power RF sources.

✘ Operate the detector with the front cover removed, or with one or more of the cover fixing screws loose or missing.

✘ Test the response of the detector using aerosol synthetic smoke.

13. Stratos-Micra 100 specification

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
Size (mm)	300W x 220H x 90D
Weight	3.8kg with docking station
Operating temperature range	0 to +38°C (UL268) –10 to +60°C (EN 54-20)
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	400mA
Relay contact rating	500mA @ 30V
Maximum sampling pipe length	100 metres total (see design limitations on section 5)
Sampling pipe inlets	2
Sampling pipe internal diameter	15-25mm
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 5 years (depending on environment)
Laser lifetime (MTTF)	Greater than 1000 years
Programming	PC via RS232/RS485
Data bus cable	RS485 data cable
Data bus length	1.2 km
IP rating	IP50

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.**

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