

# Stratos HSSD<sup>®</sup>

HIGH SENSITIVITY SMOKE DETECTOR



## Installers handbook

LM 8005 issue 15 - Software Rev. 3.4 Onward



THE QUEEN'S AWARDS  
FOR ENTERPRISE:  
INTERNATIONAL TRADE  
2002



Quality system cert. no. 404  
Assessed to ISO 9001

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## Introduction

*Stratos-HSSD*<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, while optimising performance.

Stratos incorporates a patented 'artificial intelligence' known as *ClassiFire*<sup>®</sup> which guarantees as accurately as possible that the detector conditions itself to set 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.

Stratos is unique in being able to provide a consistent level of protection in a very wide range of environments by continually making minor adjustments to sensitivity.

Stratos has proven its worth 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.

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**Help Lines**



**NB** 



*This equipment should be installed by trained personnel*

*This equipment is not designed for insertion in IT mains system*

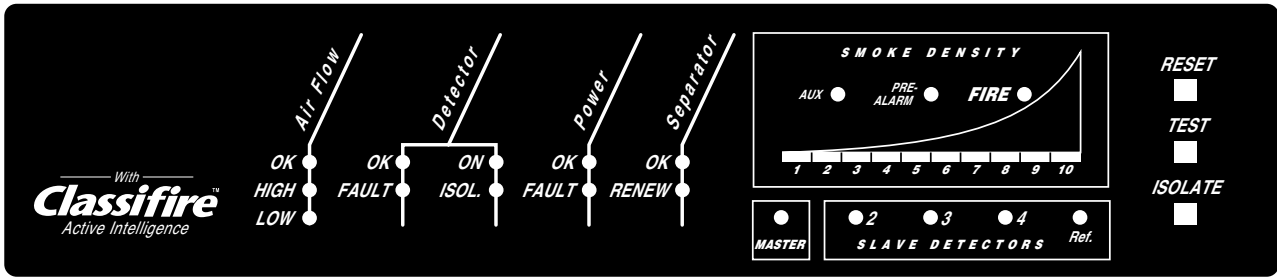
*The mains supply must be connected in accordance with BS 5839 part 1 1988 section 16-2 or to local standards as applicable - Flexible connection to a fused plug is not normally permissible.*

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

**Note:** *There are no user codes that employ the calendar function to access or operate other features.*

*The end of calendar function is defined as 31 Dec. 2035; after this date the detector should be returned to the manufacturer for refurbishment.*

## Controls & Indicators



**Air Flow** (OK, High, Low) These indicators show the status of the air flow through the detector. If a High or Low signal is indicated, then a 'fault' signal will be transmitted to the host Fire Alarm panel (if used). When first powered up or when started by the user, the Air Flow 'OK' LED will flash, indicating that detector is setting its flow high and low thresholds. The airflow limits may also be manually set.

**Detector** (OK, Fault & On, Isol.) These indicators show whether the detector is functioning correctly or not and if it is isolated or on-line. If either the 'Fault' or 'Isol.' is illuminated, then a fault condition will be transmitted to the host Fire Alarm panel. **Note:** The exception to this is when Stratos is in Programmed Isolate mode. See programmable function 41 (page 20)

**Power** (OK, Fault) These indicators show the status of both the battery back-up and the mains supply. If the amber 'Fault' indicator is flashing, then this indicates a battery fault. If it is steadily illuminated it indicates a mains electricity failure. If the 'Fault' indicator is illuminated, then a fault condition is transmitted to the host Fire Alarm panel. During mains power failure the unit can switch to optional power save mode, reducing the aspirator speed and dimming the indicator lights, see function 50, page 21.

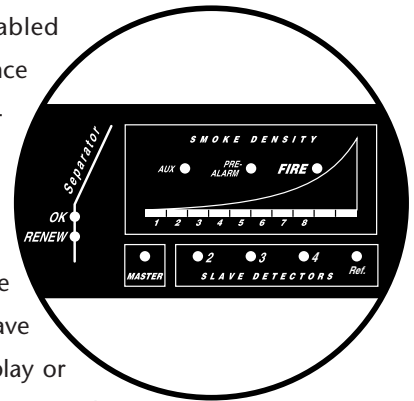
### Status Indicator LEDs

The following table lists all the possible status lights that the detector will display along with a brief explanation of what they mean.

Display	Meaning
Air flow OK illuminated steady Air flow OK flashing. Air HIGH illuminated steady Air flow LOW illuminated steady	Normal operation. <i>The air flow is within limits.</i> The detector is currently setting up the air flow high and low thresholds. The air flow is high. <i>The sampling pipe may be broken.</i> The air flow is low. <i>The pipe may be blocked or the aspirator faulty.</i>
Detector OK illuminated steady Detector FAULT flashing. Detector FAULT illuminated steady	Normal detector head operation. <i>No faults.</i> The slave loop error rate is too large. <i>Check the slave loop cable integrity.</i> A detector head fault or process error has occurred.
Detector ON illuminated steady Detector ISOL illuminated steady Detector ON flashing	Normal operation. <i>The detector is on-line and capable of generating alarms.</i> The detector is Isolated and not capable of generating alarms. Demonstration mode has been entered. (see page 36)
Separator OK illuminated steady Separator RENEW flashing Separator RENEW steady	Normal separator operation. <i>No faults.</i> The dust separator has been removed. The dust separator needs replacing.
Power OK illuminated steady Power FAULT flashing Power FAULT illuminated steady	Normal operation. <i>No faults.</i> Battery fault. <i>The battery is discharged or not connected.</i> Mains fault. <i>The system is running from stand-by batteries.</i>

## Slave Detectors

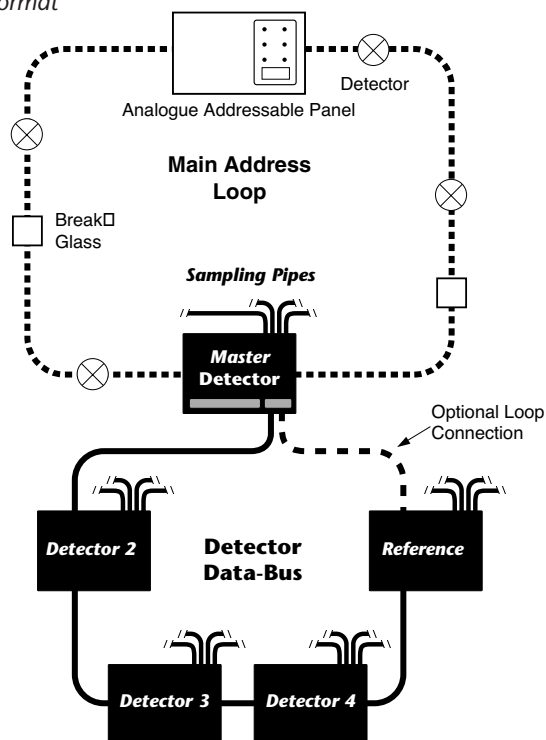
These indicators are unique to Stratos and it is important that their function is understood. They are enabled automatically when Slave detectors or Reference detectors are connected to the *Stratos*-HSSD slave-loop and the master detector is reset to factory default settings (see page 13). The Slave detectors must have their address DIL switches correctly set: (see page 24) and the master detector must be fitted with a relay card for each slave attached. Slave detectors do not have their own dedicated display or power supplies, so it should be noted that when a particular Slave Detector indicator is illuminated, it is indicating the Smoke Density, Alarm or Fault condition of the slave detector indicated.



**NB** 

*Note: During normal operation each detector is displayed for 2 flashes. If any alarm, fault or smoke increase above 3 bars is indicated, then the detector display will dwell for 8 flashes to aid detector identification.*

### Detector address format



### **Separator**

(OK, Renew) These indicators signal when the dust separator needs replacing. A flashing 'RENEW' indicator shows that the dust separator has been removed. When the Separator Renew indicator is illuminated a Fault condition is transmitted to the host Fire Alarm panel. See 'Changing the Dust Separator' (Page 39) for more details.

### **Smoke Density**

This bargraph shows the current smoke density acting upon the detector. It should be noted that unlike other High Sensitivity Smoke Detectors that contain a bargraph, due to the ClassiFire intelligence, the *Stratos*-HSSD bargraph is normally 'backed off' so that no display is illuminated (this can lead to confusion during demonstrations, when the background smoke level may be high, but the bargraph does not indicate). The bargraph also displays other information during the TEST routine and it gives a special 'rolling' single segment display during the FastLearn™ period.

### **Test**

This button performs a self test on the currently displayed detector and shows alarm levels, time delays and detector sensitivity. To test a slave detector, wait for the required detector to be indicated before pressing the 'test' button. (See 'Self Test' for more details on page 14).

### **Isolate**

Pressing the ISOLATE button puts the detector 'off line' whereby it is not capable of generating any alarms. This also operates the fault relay so that a fault condition will be registered at the host Fire Alarm control panel. Press isolate again to put the detector back on line.

### **NB**

*Note - It is possible to set a 'programmed Isolate' mode, in which the fault condition is not indicated at the Fire Alarm panel. If this has been done then, due to the potential for non indication of a fire condition, if the installer forgets to remove it, a time-out of seven days has been incorporated after which the programmed isolate condition will be automatically removed.*

### **Reset**

The RESET button resets any latched alarm or fault relays and takes the unit out of programming mode.

### **NB**

*Note - In order to comply with the access requirements of National Standards this control is normally disabled. It may only be operated by entering a security code in the programmer section inside the detector enclosure or by using the Remote Software installed in a PC connected to the Serial Port.*

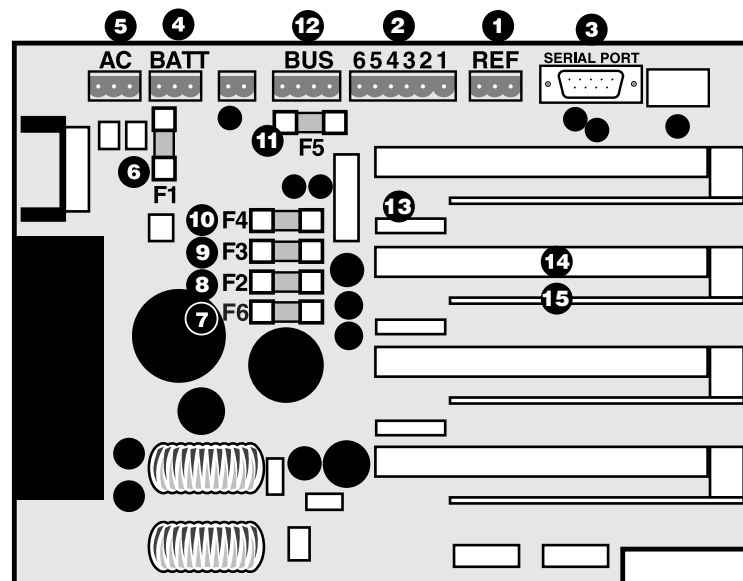
## Terminal Board

This board is designed to accept proprietary plug-in addressable modules which are available from various manufacturers. It is also possible to use proprietary 'contact' or 'switch monitoring' devices which are available from all addressable equipment manufacturers. In this case the monitoring devices should be connected to the appropriate terminal blocks provided and marked for this purpose on the output interface boards supplied with the detector.

See page 25 for details of the Addressable Interface Pin Connections

**NB** 

*Note: It is important that Relay Boards are not removed or replaced while the detector is powered as damage will occur. If fitting Relay Boards please check to ensure correct pin positioning or damage will occur. When fitting relay boards, please use the mechanical fasteners provided to prevent inadvertent disconnection.*



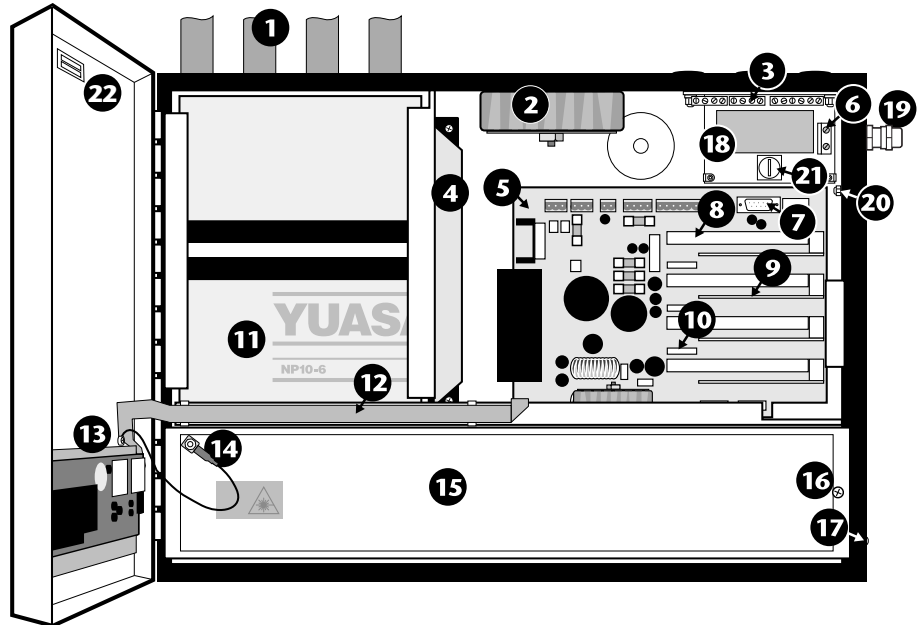
**NB** 

*All fuses are 20mm ceramic quick blow type*

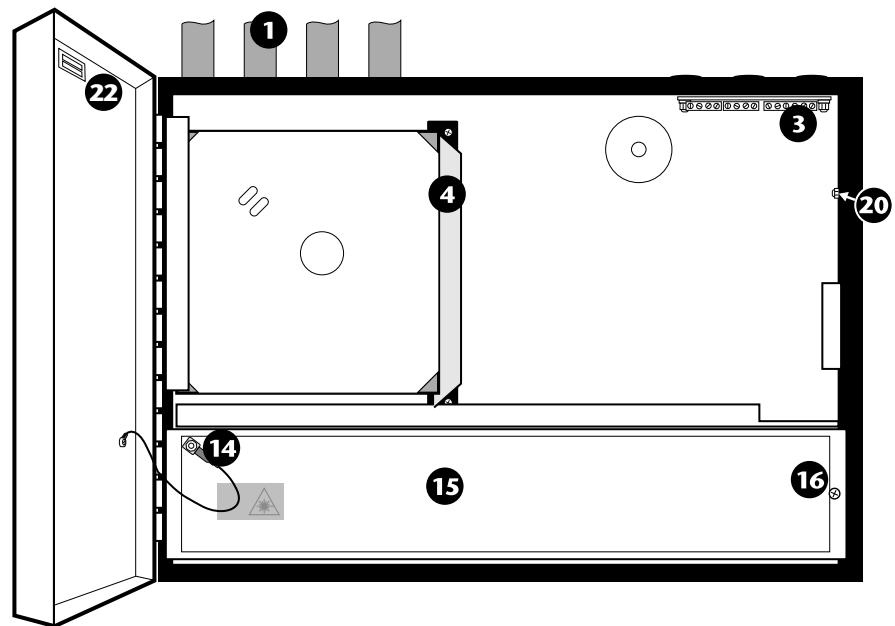
- |  |   |
|--|---|
| 1. Remote reference connector (optional)               | 8. F2 - 12V supply fuse (2 Amp)         |
| 2. Addressable loop Input-Output                       | 9. F3 - 5V supply fuse (2 Amp)          |
| 3. RS232 serial port                                   | 10. F4 - 24V supply fuse (8 Amp)        |
| 4. 12V Battery connector                               | 11. F5 - slave loop fuse (3.15A T-type) |
| 5. Transformer input or external 24 volts DC connector | 12. Slave loop connector                |
| 6. F1 - Battery fuse (8 Amp)                           | 13. Line link board connector           |
| 7. F6 - Battery charger supply fuse (4 Amp)            | 14. Output interface socket             |
|  | 15. Relay board                         |

## Master & Slave Internals

*Master detector internal view*



*Slave detector internal view*



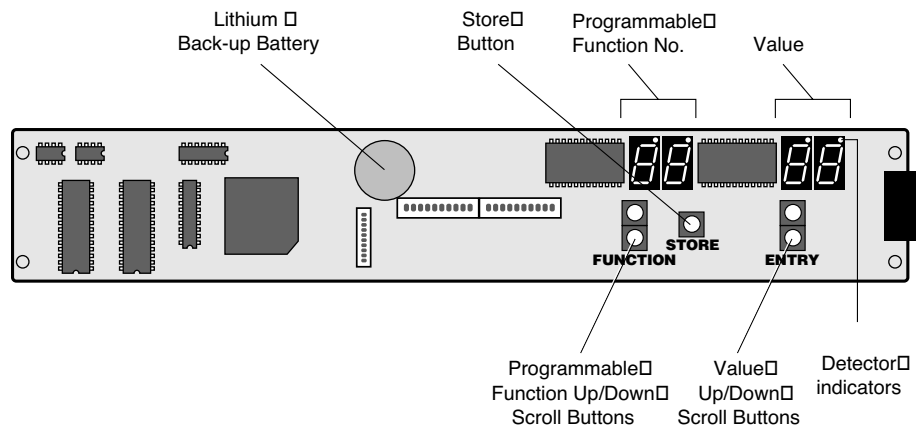
1. sampling pipes	9. relay board	17. LED alarm lamp
2. mains transformer	10. line-link board	18. Mains board
3. terminal block	11. stand-by batteries	19. Power cable gland
4. aspirator	12. ribbon cable	20. Case earthing stud
5. terminal board	13. control board	21. Power fuse
6. AC supply socket	14. earthing strap	22. Serial number
7. serial port	15. detector cover	
8. interface board socket	16. cover fixing screw	

**NB** 

*The Dust Separator & Laser Detector Chamber are covered by a removable metal plate. This plate must be removed for access to these items.*

## Inside Door Controls

In order to programme the Stratos-HSSD® unit, it is necessary to open the door of the unit using the special key provided. Attached to the lower section of the door is the programmer display illustrated below:



To operate the internal programmer, depress either of the Programmable Function scroll buttons. This will cause the LED displays to illuminate. The Programmable Function display shows the current function to be programmed. The Programmable Function number is scrolled up or down by the function scroll Up and Down push buttons. The Value display shows the value of the current function being programmed. This may only be altered if the Engineering Access code has been entered. This code may be user programmed, but **factory default is '01' for function 01 and '02' for function 02.**

Pressing the STORE button saves the programmed function value in memory. The Programmable Function and Value displays will flash briefly to show that the value has been accepted.

The programming mode has a time-out after fifteen minutes of inactivity, after which time the display will extinguish and the security code will need to be re-entered if further changes are required. This is to prevent unauthorised alterations to settings.

The LED indicators on the Control Board have decimal points at the top of their displays. If Slave detectors are connected to the data bus, these indicators will sequentially flash to mimic the Slave Detector display on the detector front display. They are used to indicate which of the slave detectors is being programmed if different values, such as ClassiFire alarm factor, time delays etc. are required for different detectors.

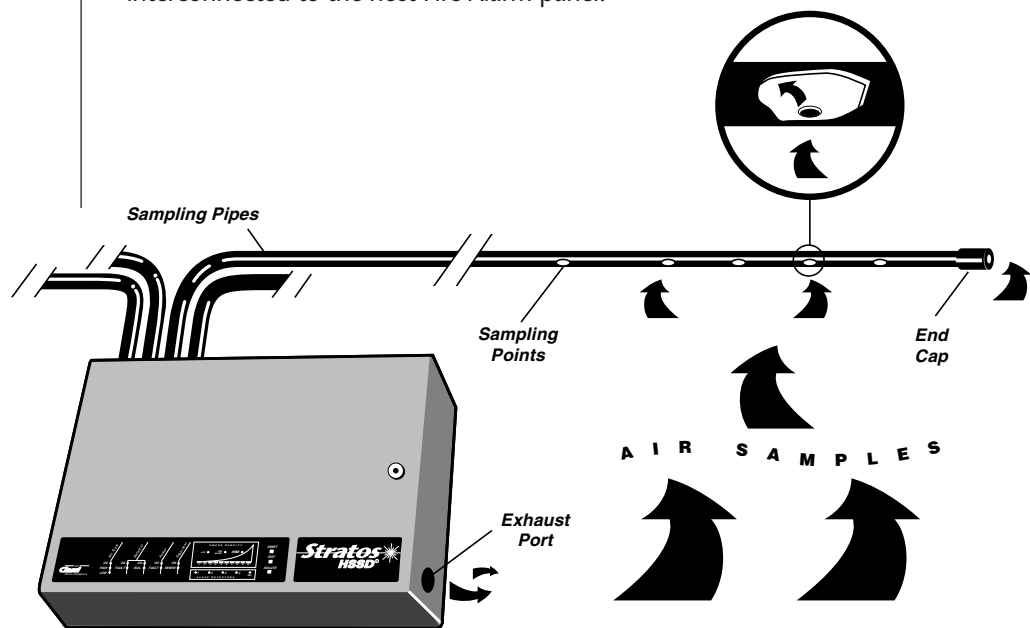
It is sometimes desirable during testing to lock the slave detector display LED, which will normally be sequentially indicating separate detectors. This is achieved by pressing the 'ENTRY' up or down keys whilst holding down the 'STORE' key. Each press of the ENTRY key will step one detector. The locked condition may be removed by either pressing the front RESET key or waiting for the 15 minute time-out.

### Slave detector setting

### Locking the Slave Detector Display

## Installing a Stratos® system

Stratos detectors should be installed according to the norms for continually aspirating High Sensitivity Smoke Detection equipment. It is not intended to explain fully in this Installers Handbook how to design the sampling pipe arrangement, but this handbook does explain in detail the electrical operation of the system and how it may be interconnected to the host Fire Alarm panel.



The detector cabinets are constructed from sheet steel. Four air inlet ports are provided on the top of the cabinet. As with all aspirating detectors, it is recommended that the detectors are located as close as possible to the protected area and ideally they should be inside it. If this is not possible and particularly if the detector location is of different air pressure to the protected area, then the exhaust air must be returned through an exhaust pipe to the same pressure zone as the sampled area. If this is not done, then sampling performance may be unreliable.

Three mounting holes are provided in the rear of the cabinet for wall mounting. When the detector is securely mounted in position, connect the mains supply. Make the appropriate field wiring connections to the terminals and line links on the terminal board in accordance with the selected fire alarm control panel manufacturers' recommendations. Do not apply mains voltage until installation complete.

Proprietary third-party addressable units may be connected to the Interface boards provided for this purpose.

## Basics of Sampling system Design

Aspirating system design is inherently simple. It is often possible to achieve good system performance with *very* simple installations. There are however a few rules which must be adhered to and these rules are equally applicable to all aspirating systems which operate on similar principles to Stratos-HSSD®. The information contained in this Handbook is intended as an overview only. For further information please see the complete System Design Manual.

1. Do not expect one detector to achieve good performance if sampling from areas of different air pressure (typically: underfloor air plenums and room spaces or different rooms in air conditioned areas). This is because the air pressure differences may cause reverse or poor air flows along the sampling pipes.

2. Always locate the sampling points in a position to which smoke may reasonably be expected to travel. This may sound obvious, but, for example do not expect ceiling mounted sampling points to operate satisfactorily if air flow prevents the cool smoke from an incipient fire from reaching ceiling level. In this instance it is usually better to locate the sampling pipes directly in the air flow (for example in an air conditioning unit air intake). There is no substitute for carrying out smoke tests prior to installation of pipes to indicate suitable sampling point location.

3. Try to locate the detector within the protected space. If this is not possible, then use an exhaust pipe from the detector exhaust port to return the air to the protected space.

4. To verify system performance it is advisable to use the AirSense PipeCAD® for Windows computerised sampling pipe modelling package.

Sampling pipes should be made from non-hazardous material and clearly identified.

**a.** Ideal internal diameter of sampling pipes is 22mm. Other sizes will often work but will usually provide slower response times.

**b.** Ideally, if the total length of sampling pipe is greater than 50 metres, then multiple pipes should be used. When using multiple sampling pipes, care should be taken to achieve a reasonable degree of balance (say within 10% of length) to ensure even suction from the pipes.

**c.** Maximum recommended total sampling pipe length is 200 metres. *Note: This is 4 lengths of 50 metres, or 2 lengths of 100 metres.*

**d.** Sampling pipes must have capped ends. The end cap should be drilled with a sampling hole normally between 4 or 5mm diameter free from all burrs.

Sampling holes should normally be 3-4mm diameter free from all burrs and each length of pipe should not have more than 25 holes. Pipe transit time must not exceed 120 seconds and an approved pipe type must be used for LPCB installations.

**NB** 

## ClassiFire® Alarm Factor Setting

This guide holds true for *average* sampling pipe lengths, but if using long pipes (typically more than 60 metres total), performance may be improved by making the sampling holes near the ends slightly larger than those nearer the detector. Although by no means essential, it must be recommended that if in doubt, PipeCAD® be used to ensure that transit times, balance of suction and individual sampling point sensitivity are within desired limits, and a higher sensitivity than 5% obs/m.

The typical background smoke density of the area to be protected must be assessed and the figure for detector sensitivity in obs/m estimated. A guide to typical ClassiFire settings is given below. A Stratos-HSSD could be used to measure the background smoke level.

By entering the estimated detector sensitivity along with the number of sampling points, size of sampling holes and the length of pipe work into PipeCAD, the sensitivity of each sampling hole will be calculated. The detector sensitivity, hole size and number of holes can be varied in PipeCAD to calculate the optimum system performance to meet the required coverage area sensitivity. For LPCB approval the sampling hole sensitivity must be better than 5% obs/m and the detector sensitivity range to achieve this should be noted and checked during routine maintenance checks.

Apart from ensuring that the clock and calendar are correctly set, the most important adjustment to be made by the installer/commissioning engineer is the ClassiFire alarm factor setting.

An appropriate ClassiFire alarm factor may be programmed to suit the anticipated environment. The setting of this alarm factor will influence the frequency of nuisance alarms. It will also affect the sensitivity of the detector to unusual smoke densities. The system will automatically maintain its sensitivity level to give a selected probability of a nuisance alarm occurring with normal variations in smoke density. Many factors will influence the selection of the ClassiFire alarm factor, such as cost or inconvenience of a nuisance alarm or the value of the area being protected.

The following table gives a suggested guide to the setting of the ClassiFire alarm factor. Factory default is 'ClassiFire alarm factor 4' (medium sensitivity).

ClassiFire Alarm Factor	Degree of Protection	Probability of Nuisance Alarm
0	Extremely High	Once in 1 year
1		Once in 5 years
2		Once in 10 years
3		Once in 50 years
4	Medium	Once in 1,000 years
5	Normal	Once in 5,000 years

Recommended Alarm Factors would be:-

0	Clean room	3	Clean Factory
1	Computer room	4	Warehouse
2	Non-Smoking office	5	Warehouse with diesel trucks operating

## Factory default

When first powered up the detector automatically initiates a 15 minute 'FastLearn™' routine whereby the approximate correct sensitivity for the environment is determined. This is necessary because the detector has a very wide sensitivity operating range and it needs to determine the appropriate sensitivity for its environment. Therefore a degree of care should be taken to ensure that, when first or subsequently powering up the detector(s), the environment bears a resemblance to that anticipated during normal use.

During the 15 minute FastLearn period, the detector(s) have the ability to vary their sensitivity and alarm thresholds at high speed and the detectors are incapable of generating alarms. At the end of the FastLearn period, the detector(s) will be capable of generating alarms, but will be operating at relatively low sensitivity. They will take a further 24 hours to fully optimise their sensitivity to suit the environment, unless 'demonstration mode' is entered (see page 36).

The ClassiFire system utilises the 24 hour period to determine the optimum sensitivity setting for daytime and night-time periods.

During initial power-up the detector will automatically set the air flow 'high' and 'low' fault thresholds.

Setting the detector to its factory default state returns the programmable options to the values given in the programmable function list (see page 15).

The controller then sequentially scans the detector addresses to find out how many detectors are connected to the slave-loop. It then runs diagnostic checks on each detector to verify correct operation. During these checks the detector being interrogated is indicated by its front panel 'Slave Detector' indicator LED being illuminated.

### **NB**

*Note - All the attached detector addresses must be sequential as the controller will stop scanning upon receiving the first detector failure, see page 24 - **Setting detector addresses**.*

Diagnostic checks are initiated on the reference detector and, if successful, Local Referencing is automatically enabled.

## Self test

The self test can be run at any time by pressing the TEST button on the front panel, provided that the button has been enabled (function 36 page 19) which is its factory default state.

The self test is in four parts:

- ❶ All of the LED indicators on the front panel are illuminated (lamp test).
- ❷ The currently displayed detector (slave or master detector display) has diagnostics run on it.
- ❸ Alarm levels and time delays are displayed in the following order:
  - a. The Aux. level is displayed as a single bar graph LED while the Aux. indicator is steadily illuminated.
  - b. The Aux. time delay is shown as a bar, whilst the red Aux alarm indicator flashes. The entire bargraph illuminated represents 60 seconds (max. time delay) The longer the bar the longer the delay.
  - c. The Pre-Alarm level is displayed as a single bar graph LED. While the Pre-Alarm indicator is steadily illuminated.
  - d. The Pre-Alarm delay is being shown whilst the Pre-Alarm LED flashes.
  - e. The Alarm level is displayed as a single bargraph LED. This is always level 8 and cannot be altered.
  - f. The Alarm delay is being shown whilst the Alarm LED flashes.
- ❹ The detector sensitivity is shown as a flashing bar. The longer the bar, the higher the sensitivity. The actual detector sensitivity in % obscuration per metre is displayed on the function and value display (see page 9) on the internal programmer during the test routine.

## Programmable function listing

Function No.	Description	Possible Values	Default Value	Notes
1	Engineering code part 1	00 to 99	—	1
2	Engineering code part 2	00 to 99	—	1
3	Factory default set up values	'y' or 'n'	'y'	
4	Number of detectors (excluding reference)	01 to 04	—	7
5	Local reference enable	'y' or 'n'	—	7
6	Remote reference enable	'y' or 'n'	'n'	7
7	Reference level	00 to 99	00	4
8	Reference signal decay time (minutes)	00 to 99	15	4
9	FastLearn enable	'y' or 'n'	'y'	6
10	Pre-alarm level	03 to 08	06	4
11	Aux level	02 to 10	10	4
12	Alarm delay in seconds	00 to 60	05	4
13	Pre-alarm delay in seconds	00 to 60	05	4
14	Aux delay in seconds	00 to 60	05	4
15	Customer default save	'y' or 'n'	'n'	
16	Customer default restore	'y' or 'n'	'n'	
17	Time: Hour (24 hour format)	00 to 23	12	8
18	Minutes	00 to 59	00	8
19	Date: Day	01 to 31	01	8
20	Month	01 to 12	01	8
21	Year	00 to 99	92	8
22	Battery check enable	'y' or 'n'	'y'	
23	Mains check enable	'y' or 'n'	'y'	
24	Low airflow fault threshold	00 to 99	—	4,7
25	High airflow fault threshold	00 to 99	—	4,7
26	Air Flow rate	00 to 99	—	4,5
27	Latching alarms enable	'y' or 'n'	'n'	
28	Remote reset enable	'y' or 'n'	'n'	
29	Cascading alarms	'y' or 'n'	'y'	
30	Time delay override	'y' or 'n'	'n'	
31	User defined engineering access code part 1	00 to 99	01	2
32	User defined engineering access code part 2	00 to 99	02	2
33	Hour start of day operation	00 to 23	08	4
34	Hour start of night operation	00 to 23	19	4
35	ISOLATE button enable	'y' or 'n'	'n'	
36	TEST button enable	'y' or 'n'	'y'	
37	RESET button enable	'y' or 'n'	'n'	
38	Alarm factor for ClassiFire function	00 to 05	04	4
39	ClassiFire override (% of signal)	00 to 99	00	4
40	Remote Isolate enable	'y' or 'n'	'n'	
41	Programmed Isolate mode	'y' or 'n'	'n'	
42	Aspirator speed (1 = low 10 = high)	01 to 10	05	4
43	Watchdog trip count	00 to 99	00	5
44	Histogram print	'y' or 'n'	'n'	3
45	Event log print	'y' or 'n'	'n'	3
46	Firmware revision	00 to 99	Current	
47	Chart log recording rate	0 to 5	5	
48	Fault latch enable	'y' or 'n'	'y'	
49	Remote mimic enable	'y' or 'n'	—	7
50	Power save enable	'y' or 'n'	'y'	
51	Dust separator condition	80 - 99	—	4
52	Auto FastLearn enable	'y' or 'n'	'y'	
53	LDD™ enable	'y' or 'n'	'y'	
54	Remote day/night	'y' or 'n'	'n'	

## Function Listing Notes

**NB** 

❶ The factory default user defined access code is 01, 02.

**NB** 

❷ The user defined access code can only be viewed when a valid access code has been entered in Functions 1 and 2.

**NB** 

❸ Pressing store with 'y' selected causes an immediate print out of the histogram or event log, followed by the selected Function being automatically reset to 'n'. These Functions cannot be changed when the histogram viewer mode is operational.

**NB** 

❹ These entries have a separate value for each detector. The value for a detector is displayed when its front panel indicator is illuminated. This is shown by a dot in the appropriate detector position on the programmer display.

**NB** 

❺ This value is for display purposes only and cannot be modified.

**NB** 

❻ Setting this function to 'y' (yes) will start a fast learn for fifteen minutes after which the function will be reset to 'n' (no).

**NB** 

❼ These items are automatically set when 'factory default' is activated. See 'Factory Default' (page 13) for more details.

**NB** 

Ω These values are reset when the detector's RAM contents are cleared (eg. if the software chip is replaced).

## Programmable functions in detail

### **Function 1 & 2 - Engineering access code**

Before any of the operating parameters of the detector can be modified, the user must first enter an engineering access code. If this code has not been entered, the user may scroll through the functions and view the settings, but cannot modify them.

### **Function 3 - Factory default**

This function has two purposes. If any function of the controller has been changed by the user, this function will display 'n', indicating that it is not at factory default. Setting this function to 'y' will set the controller to factory default: See 'Factory Default' (page 13) for more details.

### **Function 4 - Number of detectors**

This function is set to the number of detectors found when the controller was set to factory default: See 'Factory Default' (page 13) for more details.

### **Function 5 - Local reference enable**

A local reference detector is a reference that is on the controller's slave detector loop. This function is also set appropriately at factory default: See 'Factory Default' (page 13) for more details.

### **Function 6 - Remote reference enable**

Remote reference enable is for when a reference detector that is on another Master detector controller's slave detector loop is used for an input reference signal. The reference signal is output to other controllers via a two core screened cable. In this way a single reference detector may be used to reference multiple Master detector controllers (see item 1 - page 7). *FOR FURTHER INFORMATION ON SIGNAL REFERENCING PLEASE REFER TO THE TECHNICAL MANUAL.*

**NB** 

### **Function 7 - Reference level**

This function has a separate entry for each detector. The value set with this function is the percentage of compensation applied to the detector from a reference detector, if used.

### **Function 8 - Reference signal decay time**

This function has a separate entry for each detector. This feature is used in conjunction with Function 7 when pollution remains in the protected area after the source of the pollution has reduced. This value is the delay time, in minutes, for the compensation to decrease after the signal from the reference detector has decreased.

**Important  
Note**

**NB** 

**NB** 

**Function 9 - FastLearn™ enable**

Setting this function to 'y' will start a FastLearn. The bargraph display on the front of the Master detector will show a rolling segment for the fifteen minutes it takes to complete this routine. The *Value* display on the programmer will indicate the number of minutes of FastLearn remaining during this operation.

*Note:* It will take a further 24 hours for full sensitivity to be reached, unless Demonstration Mode (see page 36) has been initiated.

**Functions 10, 11 - Alarm levels**

These functions have a separate entry for each detector. The value set in these functions is the bargraph level at which the appropriate alarm is initiated. *Note:* Aux. alarm is factory set at level 10 which means that this alarm will occur after fire Alarm.

**Functions 12, 13 & 14 - Alarm delays**

These functions have a separate entry for each detector. The delay is the number of seconds that an alarm level has to be continuously sensed before the alarm is initiated.

**Functions 15 - Customer default save**

Setting this function to 'y' will save all current settings for later recall by operation of function 16. When the detector has been installed, the customer's configuration can be stored for recall if the configuration has subsequently been changed.

**Functions 16 - Customer default restore**

Operation of this function restores programmable values from previous operation of function 15.

**Functions 17, 18, 19, 20 & 21 - Time and date**

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 perform day/night switching. The current date and time is also read from the clock when an event occurs: See Event Log (page 23) for more details. Unless specially ordered, detectors are supplied with the correct setting for UK time. This is backed up with a long life lithium battery. Later adjustments to the clock setting should not exceed  $\pm 70$  mins unless a FastLearn is initiated.

**Function 22 - Battery check enable**

If no battery back-up is required, this function should be set to 'n' (no) to avoid POWER FAULT being displayed on the front panel.

**Function 23 - Mains check enable**

When using detectors with an external 12 or 24 Volt power supply this function should be set to 'n'.

### **Functions 24, 25 & 26 - Airflow monitoring**

These functions have a separate entry for each detector. The high and low airflow fault thresholds are automatically set up on initial power-up to be correct. The fault thresholds may be manually adjusted if required. Function 26 is used to display the airflow rate and cannot be changed: See 'Factory Default' (page 13) for more details.

### **Function 27 - Alarm latch enable**

When this function is set to 'y' (yes) it requires a Reset on the front panel or a remote reset to clear an alarm condition.

### **Function 28 - Remote reset enable**

If remote resetting of the detector is required from the host Fire Alarm controller, this option must be set to 'y' and the Remote Reset circuitry must be fitted to the detector.

**Note:** Only one of Functions 28, 39, 40 and 54 may be enabled.

### **Function 29 - Cascading alarms**

Setting this function to 'y' means that only when the controller has gone into pre-alarm does the controller start counting down the main Alarm delay. If it is set to 'n', and Fire delay is 0 then the Pre-alarm delay will be ignored for rapid smoke density increase.

### **Function 30 - Time Delay Override**

If this function is set to 'y' (yes), then the detector will ignore any preset time delays in the event of an unacceptably rapid increase in smoke density, thereby minimising response time to 'rapid growth' fires.

### **Functions 31 & 32 - User defined access code**

The values in these two functions are the access code that the user has to input in order to modify any of the Function values. **Note** - When scrolling through Function values and the access code has not been input, the Value display will be blank.

### **Functions 33 & 34 - Hour start of day and night operation**

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. If no day/night switching is required, then both entries should be set to '00'.

### **Functions 35, 36 & 37 - Reset, Test & Isolate button enable/disable**

The front panel buttons may be enabled or disabled individually using these functions.

**NB** 

**NB** 

NB 

**Function 38 - ClassiFire® alarm factor**

The probability of nuisance alarm is set with this entry. 0 = high sensitivity, high probability, 5 = lower sensitivity, lower probability. (see page 12) **Note:** 'High' sensitivity cannot be achieved unless this has been adjusted to 0.

NB 

**Function 39 - ClassiFire override**

When this function is set to a value other than zero, the connection of 'Reset' (Pin 21 on universal interface card - see page 25) to 0V (Pin 26) will desensitise the detector by the specified amount in percentage terms. The remote reset circuitry must be fitted for this facility to operate. **Note:** Only one of Functions 28, 39 and 54 may be enabled.

NB 

**Function 40 - Remote Isolate Enable**

When this function is set to 'y' a remote switch may be used to isolate the detector. The remote reset circuitry must be fitted for this facility to operate. **Note:** Only one of Functions 28, 39, 40 and 54 may be enabled.

**Function 41 - Programmed Isolate**

When set to 'y' the controller will not generate alarms and will not indicate a fault condition to any fire panel which is connected. The 'ISOL.' LED will be lit on the detector display. The isolated condition will be disabled automatically after 7 days.

**Function 42 - Aspirator speed**

This function has a separate entry for each detector. The value entered sets the aspirator at a fixed speed. The lower the number entered, the lower the airflow rate.

**Function 43 - Watchdog trip count**

The watchdog is a circuit built into the controller that restarts the controller in the event of a failure to function properly. This could be as a result of electrical spikes. This count is for display only and cannot be modified.

**Function 44 - Histogram print**

Setting this function to 'y' prints the histogram in numerical format to a serial printer connected to the Master detector serial socket. The display will default to 'n' when printing is finished.

**Function 45 - Event log print**

To print out the event log to a serial printer connected to the Master detector serial socket, set this function to 'y'. It will default to 'n' when printing is finished.

**Function 46 - Firmware version**

This function displays the firmware version of the detector. This value is for display only and may not be changed. (This handbook details facilities of version 3.4).

**Function 47 - Chart log recording rate**

This function controls how frequently the output from the detector is stored in the internal chart recorder log. The recording rates per division of the chart log are as follows: **0** = no recording. **1** = 10 sec. **2** = 3 min. **3** = 10 min. **4** = 50 min. **5** = 200 min. (5 = factory default). At the slowest recording rate, one week of data can be recorded for all four detectors. In a single detector system this time extends to one month. A PC must be connected via the RS232 port with appropriate software to view the chart recorder log.

**Function 48 - Fault latch enable**

When this function is set to 'y' it requires a reset from the front panel or a remote reset to clear latched faults. This is the factory default setting.

**Function 49 - Remote mimic enable**

This function must be set to 'y' when using the detector with the optional remote mimic display.

**Function 50 - Power save enable**

This function allows the detector to minimise electrical power consumption when operating from stand-by batteries. If enabled, upon mains supply failure the aspirator will reduce speed and the indicator lights will reduce in brightness.

**NB** 

*Note - Any increase in smoke reading above 3 bars will automatically remove this condition.*

**Function 51 - Dust separator condition**

The value given at this function is the efficiency rating of the dust separator element. A new element will display '99'. When the efficiency has decreased to '80', the Dust Separator Renew indicator LED will illuminate.

**NB** 

*Note - Fitting a new element will reset this figure to 99.*

**Function 52 - Auto FastLearn Enable**

Setting this function to 'n' disables the FastLearn on initial Power-up. The detector calibration/sensitivity setting from the previous operating period will be used.

## Connection to a Computer

NB 

### Function 53 - LDD™ Enable

Laser Dust Discrimination (LDD) increases the response time of the detector slightly. LDD may be disabled in clean rooms for faster response to smoke.

### Function 54 - Remote day/night

Using this function the detector can be switched between day and night mode using the remote reset input. **Note:** *Only one of Functions 28, 39, 40 and 54 may be enabled.*

All Stratos-HSSD® master detectors incorporate an inbuilt serial port. This connector, which conforms to the IBM PC/AT standard, has four uses. Firstly, it may be used for data printouts to a serial printer. It may be used for connection to a PC for remote programming and setup. It may be used to perform diagnostic checks and viewing of historical event logs etc.

The serial port may be connected to a standard modem for access from a remote site.

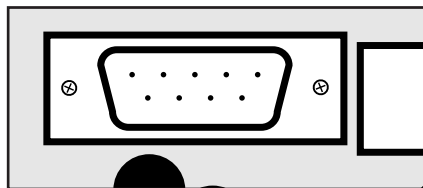
Using the software supplied with the detector, any PC or compatible can be connected to the controller.

If using MSDOS, to run the software type 'STRATOS' at the DOS prompt. At this point pressing the 'RETURN' key causes the detector controller to go into remote mode and display the log-on screen. Pressing the 'ESCAPE' or 'ESC' key at any time will exit remote mode and return to the DOS prompt. To log-on, type the user Engineering access code as a four digit number when prompted. Successfully entering this code number brings up the main menu screen from which the controller can be set-up; diagnostics run, or various graphical displays of status information can be displayed.

Alternatively the Windows based Remote software may be used. This is compatible with version 3.1 upwards of the Windows operating system. The Windows Remote software offers superior features compared to the MSDOS version.

The remote mode has a time-out of five minutes of inactivity or, alternatively, pressing the 'RESET' key on the detector front panel ends the remote connection.

See page 36 for details of the Serial Port Connections.



*Serial Port on Terminal board*

## Event Log

An event is defined as operation of any of the front panel controls (when enabled) or a detector level exceeding the AUX., PRE-ALARM or FIRE thresholds. The event log will also store items such as day and night start times, Intermediate learn override (demonstration mode), power fault, detector fault etc. The detector keeps a log of the last 100 events for reference purposes.

The event log can be viewed or printed using a PC which has been installed with the standard software and is connected using a serial cable.

The event log can be printed out to any Serial device by using Function 45, which prints out the event log in reverse order i.e. the last recorded event is printed out first.

When the buffer that stores events is full (more than 100 events) and a new event occurs, the oldest event in the buffer is discarded (First-In, First-Out).

The information stored with each alarm event is detailed below.

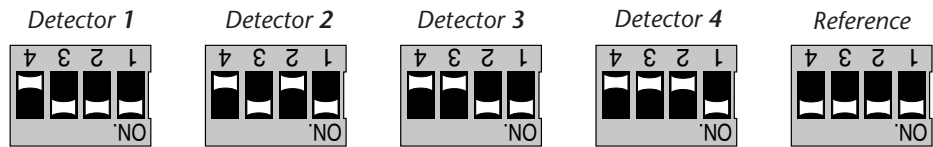
Information	Description
Time	the time the event was first detected (24 hour format)
Detector	the number of the detector reporting the event
ALARM time	the time the level was at or over the ALARM level
PRE-ALARM time	the time the level was at or over PRE-ALARM
AUX. time	the time the level was at or over AUX
ALARM level	the ALARM level at the time of the event
PRE-ALARM level	the PRE-ALARM level
AUX. level	the AUX. level

## Setting Detector Addresses

In order that the Master detector may communicate with slave detectors which operate on its slave-loop, the Detector Address Switches must be correctly set. These DIL Switches may be found on the Detector circuit board located behind the steel cover plate. (see item 15 - page 8) The illustration below show the correct switch positions as viewed from the front of the detector.

**NB** 

*Note* - The Master is Detector number 1.



## Universal Plug-in Interface Board Connections

**NB** 

### Interface Board Pin Table

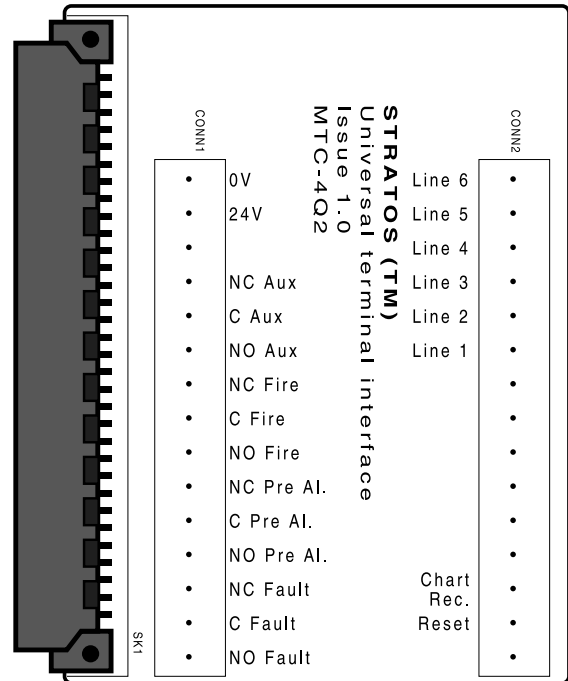
**NB** 

The Universal Terminal Interface Board can be used to connect proprietary Addressable Interface Units to the Detector.

**Note** - All Interface boards are mounted in the Master for a Multiple Detector System.

\*These are Volt free relay contacts. The designation 'Normally Closed' and 'Normally Open' refer to the non-energised relay coil.

**Note** - In normal operation (i.e. no fault) the fault relay is energised, hence the 'Fault Normally Closed' contact is open.



Pin	Signal	Direction
1*	Fault normally closed	output
2*	Fault common	output
3*	Pre Alarm normally open	output
4*	Pre Alarm common	output
5*	Fire normally open	output
6*	Fire common	output
7*	Fault normally open	output
8*	Pre Alarm normally closed	output
9*	Fire normally closed	output
10*	Aux normally open	output
11*	Aux common	output
12*	Aux normally closed	output
13	unused	-----
14	Committed	output
15	Committed	-----
16	24 Volt regulated	output
17	unused	-----
18	unused	-----
19	unused	-----
20	unused	-----
21	Remote reset	input
22	Chart Recorder	output
23	unused	-----
24	unused	-----
25	Committed	-----
26	0 Volts	output
27	Line 1	-----
28	Line 2	-----
29	Line 3	-----
30	Line 4	-----
31	Line 5	-----
32	Line 6	-----

## Universal plug-in interface board

In the majority of applications the detector will be required to signal Pre-alarm, Alarm and Fault to a fire control panel. Sometimes it will be required to power dedicated alarm bells, relays or other equipment. A wide variety of possible configurations is catered for by the Universal plug-in interface board and the three blocks of 18 point Line Links on the Terminal/PSU board.

The wiring arrangement shown on page 28 shows how the Universal plug-in interface board is connected to the terminal block. There are three sets of Line Links on the Terminal/PSU board for interconnecting up to four detectors (1 x Master and 3 x Slaves) to the six output lines. The required connections are made by connecting header pin links between these pads. Where no configuration has been specified at time of ordering the detector, it will be delivered with none of the links made. Links must be placed in order to obtain any connection between the Universal plug-in board and the connection to the line terminal block. In addition to this there must be circuitry on, or connected to, the Universal plug-in board to place the necessary conditions on the lines to suit the control panel used. The following information is intended to indicate how to customise the detector to suit a specific application.

Where an Apollo addressable interface between the detectors and the lines is required, a purpose made board to replace the Universal plug-in unit is available.


### Signals and voltages available on the Universal Interface plug-in PCB.

#### 0 Volts

This is the reference for all signals and voltages. It must not be connected directly to earth or the unit's metal work.

#### 24 Volts

In the normal power configuration (mains supply with 12 volt back-up battery), this voltage is made available at all times for driving 24 Volt components such as sounders and beacons. Its capacity is 500 mA. max.

**NB**  *Note: For LPCB approved installations this supply must not be used.*

#### NC, C, & NO Aux.

These are volt free relay change over contacts which connect C to NO when an AUX. level is signalled by the detector. They connect C to NC when AUX. level is not signalled by the detector. **Note:** *Standard Alarm and Fault relays contact ratings are 1A @ 24VDC. and they are proof against 500 volt spikes, unless LPCB approved relays are ordered where they are rated at 1500V. 'Normally Closed' and 'Normally Open' applies to the non-energised condition.*

#### NC, C, & NO Fire.

These are volt free relay change over contacts which connect C to NO when a FIRE level is signalled by the detector. They connect C to NC when FIRE level is not signalled by the detector.

#### NC, C, & NO Pre-AL.

These are volt free relay change over contacts which connect C to NO when an PRE-ALARM level is signalled by the detector. They connect C to NC when PRE-ALARM level is not signalled by the detector.

#### NC, C, & NO Fault.

These are volt free relay change over contacts which connect C to NC when a GENERAL FAULT CONDITION is signalled by the detector. They connect C to NO when there is not a GENERAL FAULT CONDITION signalled by the detector. **Note** *that the operation is the reverse to the other relays, in order to provide 'fail safe' operation.*

#### Chart Rec.

This is the output of a six bit D-A converter. It gives a pseudo linear output of 0 to 10 Volts proportional to the bargraph display. A Detector Fail will be indicated by a 0 Volts output.

#### Reset

Connecting this input to 0 Volts activates one of the functions 28 (remote reset), 40 (remote isolate) or 39 (ClassiFire override). Only one of these functions can be enabled.

### **LINE 1 to LINE 6**

These are the terminations connected to the terminal block. (see diagram & description page 28). The examples illustrated on page 29 show board configurations for common installations.

#### **Example 2** (page 29).

Single-detector zone. All the connections are isolated from the detector internal supplies.

This is to work in a conventional (non-addressable) system where Alarm and Fault are signalled to the control panel by drawing different currents from the 18 Volt zone lines. Alarm signal current is greater than 40 mA. Fault signal current is 15 mA. +/- 2 mA.

#### **Example 3** (page 29).

The detector is driving an external relay. Due to the limited power switching capabilities of the detector output relays, this may be required for the switching of greater current.

The example shows an external (mounted outside the detector) 24 Volt relay powered from the detector power supply. The connection of line links 1 & 2 bring out the relay connections on Line 5 and Line 6 and the board wiring powers the relay when the Auxiliary level (programmed separately) has been reached.

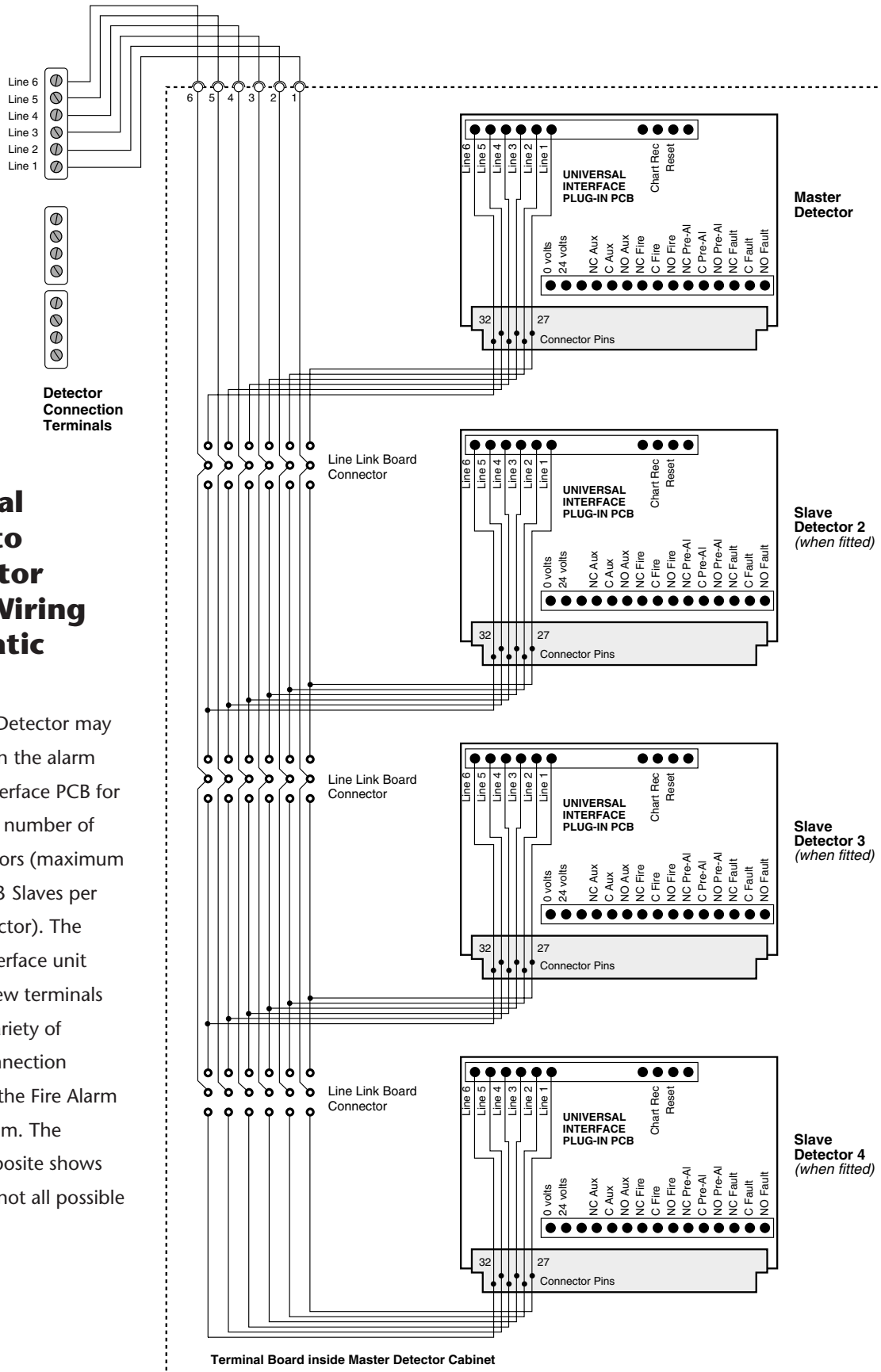
#### **Example 4** (page 29).

The Line Links shown on page 29 bring out connections on Lines 2, 3, 4, 5 & 6. The interface unit is assumed to contain its own pull up resistors on the inputs and the true condition to be signalled by pulling the input down. This may be varied to suit the specific addressable interface.

The Line number connections in these examples have been chosen at random and may be varied to suit the application by altering the Line Links and, for examples 1 & 2, keeping the board as shown.

## Terminal Board to connector block Wiring Schematic

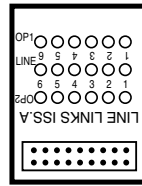
The Master Detector may be fitted with the alarm Universal Interface PCB for the required number of Slave Detectors (maximum 1 Master & 3 Slaves per Master Detector). The standard interface unit contains screw terminals to allow a variety of different connection methods to the Fire Alarm control system. The diagram opposite shows several, but not all possible methods.



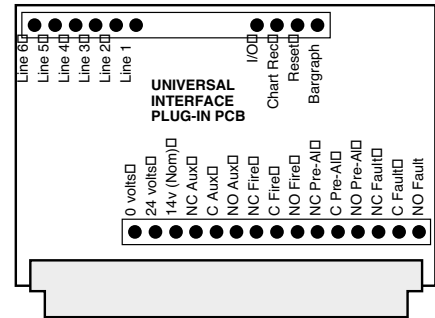
# Examples of Connector Methods

**1**

No lines connected



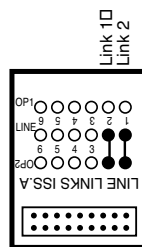
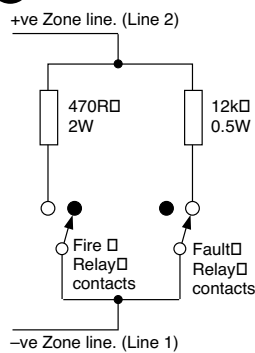
Line Links Board Connections



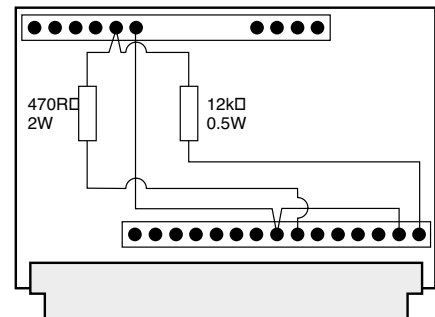
Interface Board Connections

**2**

Single detector zone



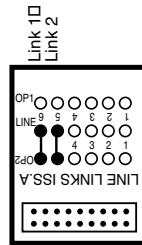
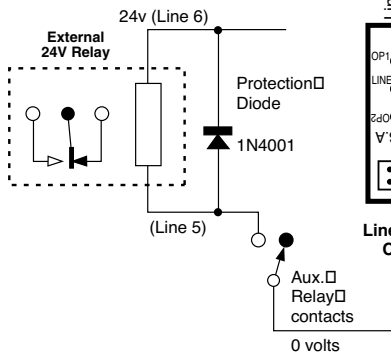
Line Links Board Connections



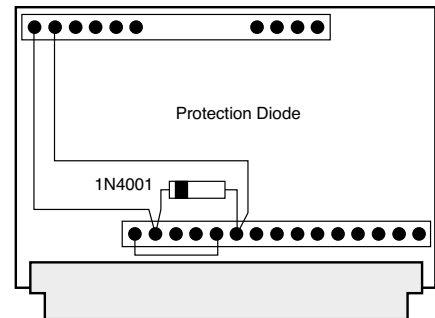
Interface Board Connections

**3**

Driving external relay



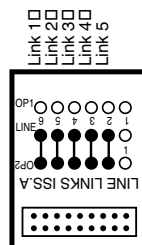
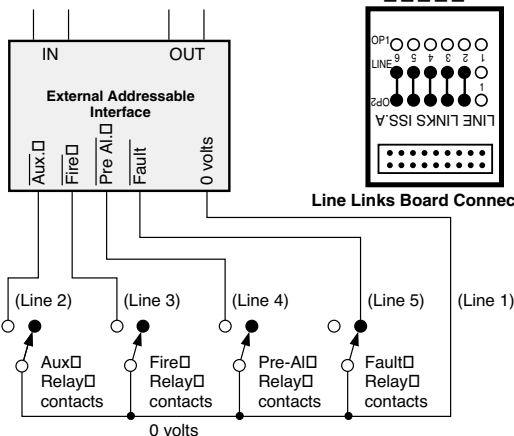
Line Links Board Connections



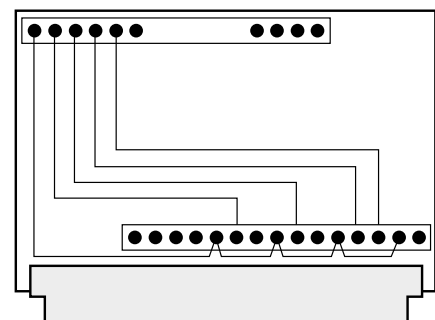
Interface Board Connections

**4**

Using an external addressable module



Line Links Board Connections

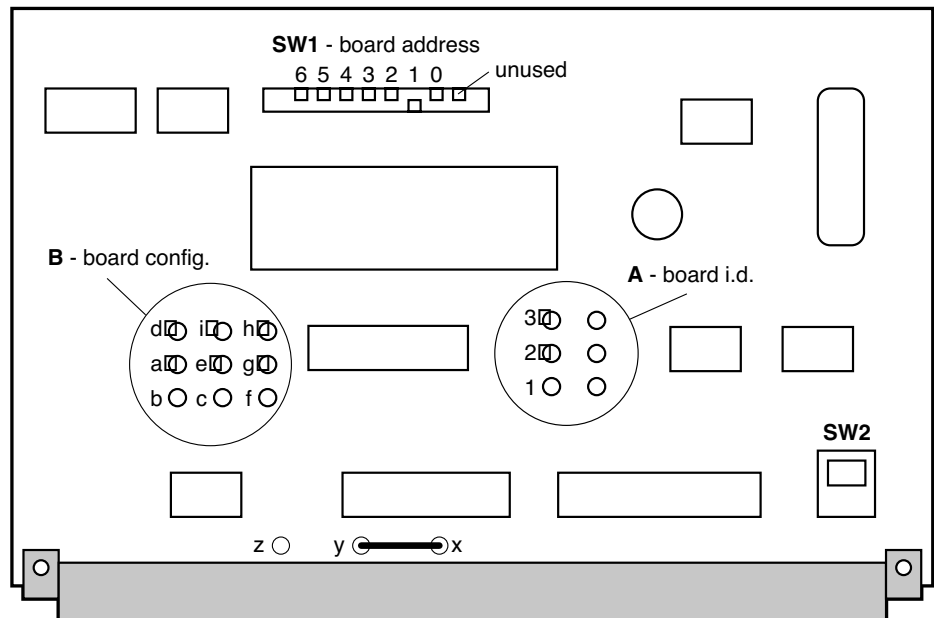


Interface Board Connections

## Apollo Series 90 & XP95 Interface card set-up

The layout of the Apollo interface card is shown below. One card per detector is installed up to a maximum of four. Relay boards must be fitted for each detector. The board is highly configurable and can be set up to emulate any type of Apollo detector.

The board is powered from the Master Detector, not the Apollo line. This means that the detector must be powered-up for the Fire Alarm Panel to 'see' the interface.



Switch SW1 sets the card's address on the Apollo loop. Each card must have a unique address, bits are marked on the board. The board shown has its address set to 2.

Switch SW2 sends the scaled analogue value of the bargraph back to the Fire Panel when the switch is in the down position. Optional circuitry must be fitted at time of order if the analogue value is to be used. For more details on the chart recorder output that is used to generate this analogue value see *Stratos-HSSD*<sup>®</sup> full Technical Manual. When SW2 is in the up position (as shown), only four pseudo analogue levels are sent; 32 for normal operation, 2 for Fault, 48 for Pre Alarm and 64 for Fire.

The pads in the area marked 'A' are the board identification links. Using these links the board can return an identifier to the Fire Panel of any type of Apollo detector. To set a link the numbered pad must be connected horizontally to the pad on its right. The link settings to return an identifier for various detectors are displayed on page 31 opposite.

Links x, y and z set whether all faults or just head faults are reported back to the main panel. The board is factory set to report all faults. Contact AirSense Technology if this facility is to be changed from its default setting.

Detector Identification	Link Settings
Optical smoke monitor	Link 2 across
Ionisation smoke monitor	Link 1 across
Remote interface unit	Link 1 and 3 across

The pads in the area circled and marked 'B' are the board configuration links. These may be set to give added status signals between detector and the fire panel.

Pad	Direction	Use
a	From detector	Auxiliary relay output
b	From detector	Fault
c	To detector	Remote reset
d	To panel	Input bit 0
e	To panel	Input bit 1
f	To panel	Input bit 2
g	From panel	Output bit 2
h	From panel	Output bit 1
i	From panel	Output bit 0

As an example; to drive the detector remote reset line from output bit 0 from the fire panel link 'i' to 'c'. Connect only one signal at a time from connections d - i to a - c.

As shipped the default settings for the Apollo board are:

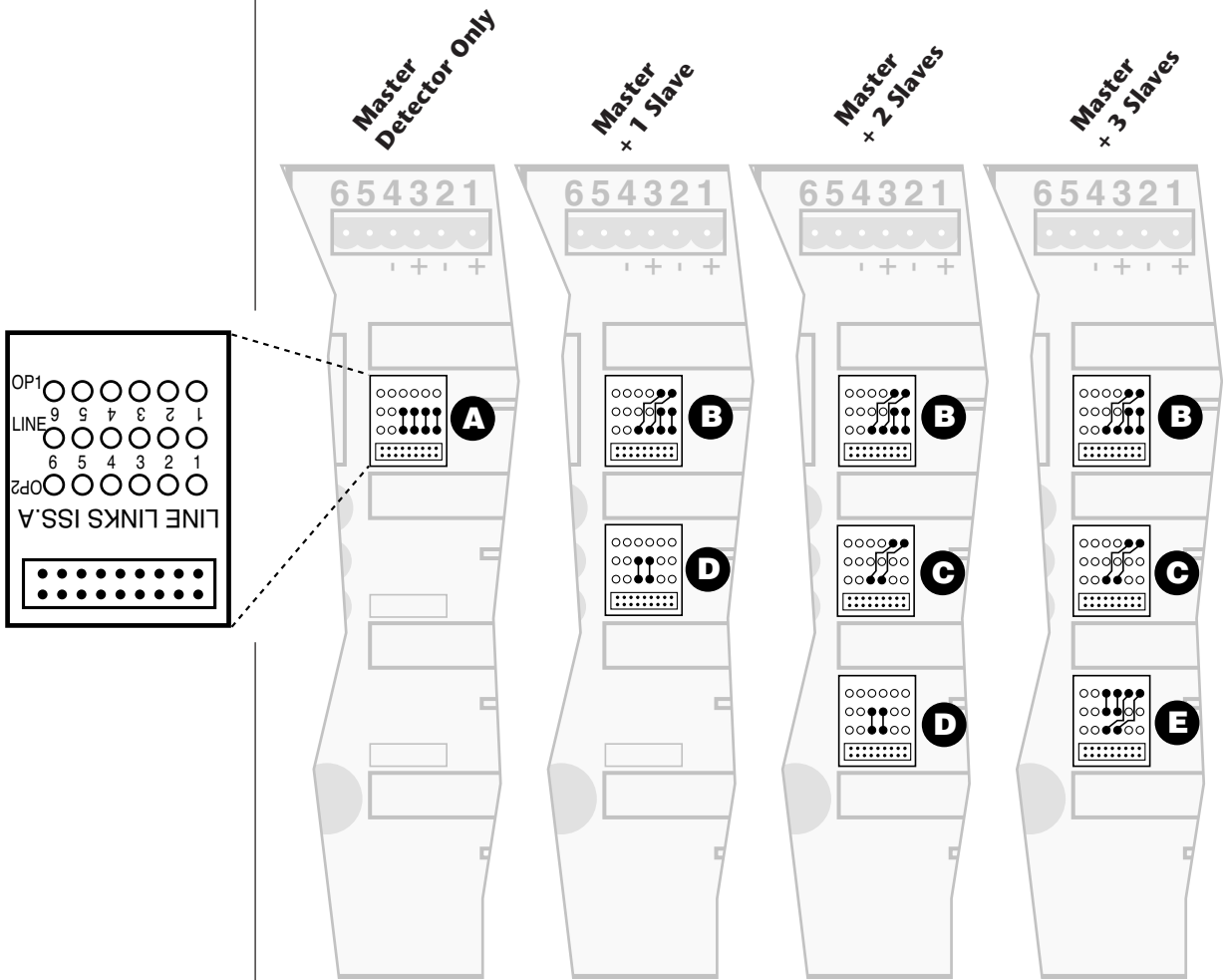
Board i.d.	board config.	fault reporting
Optical smoke monitor	none	all faults
link 2 made	no links	y linked to x

## Terminal Board Line Link Connections (for Apollo Interface Card)

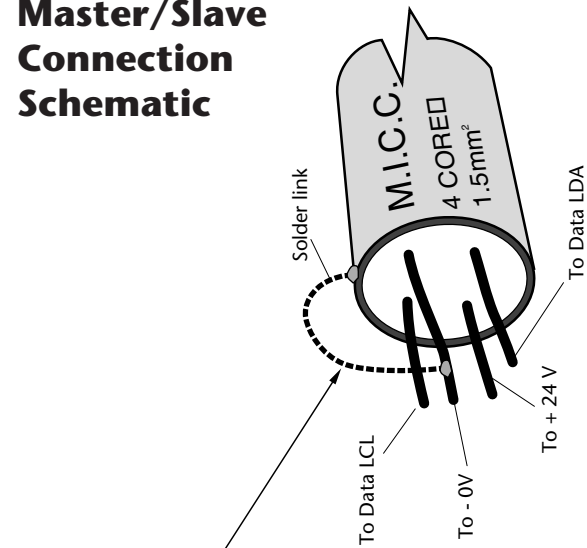
In order that the Interface Boards can signal Alarm or Fault conditions correctly at the Detector Terminal Block when used with an addressable type Control Panel, it is important that 'line links' are made in the appropriate positions. The following illustration shows the position and connection details of the Line Link boards on the main Terminal Board. A, B, C, D and E represent the different link configurations needed.

### Input Connections

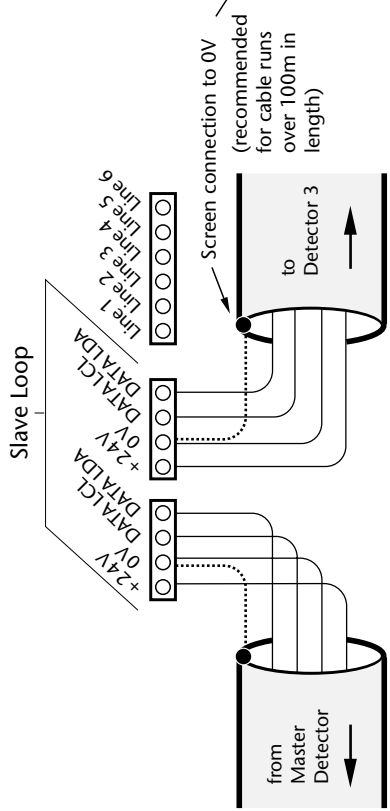
- Line 1 + ve in
- Line 2 - ve in
- Line 3 + ve out
- Line 4 - ve out



# Master/Slave Connection Schematic

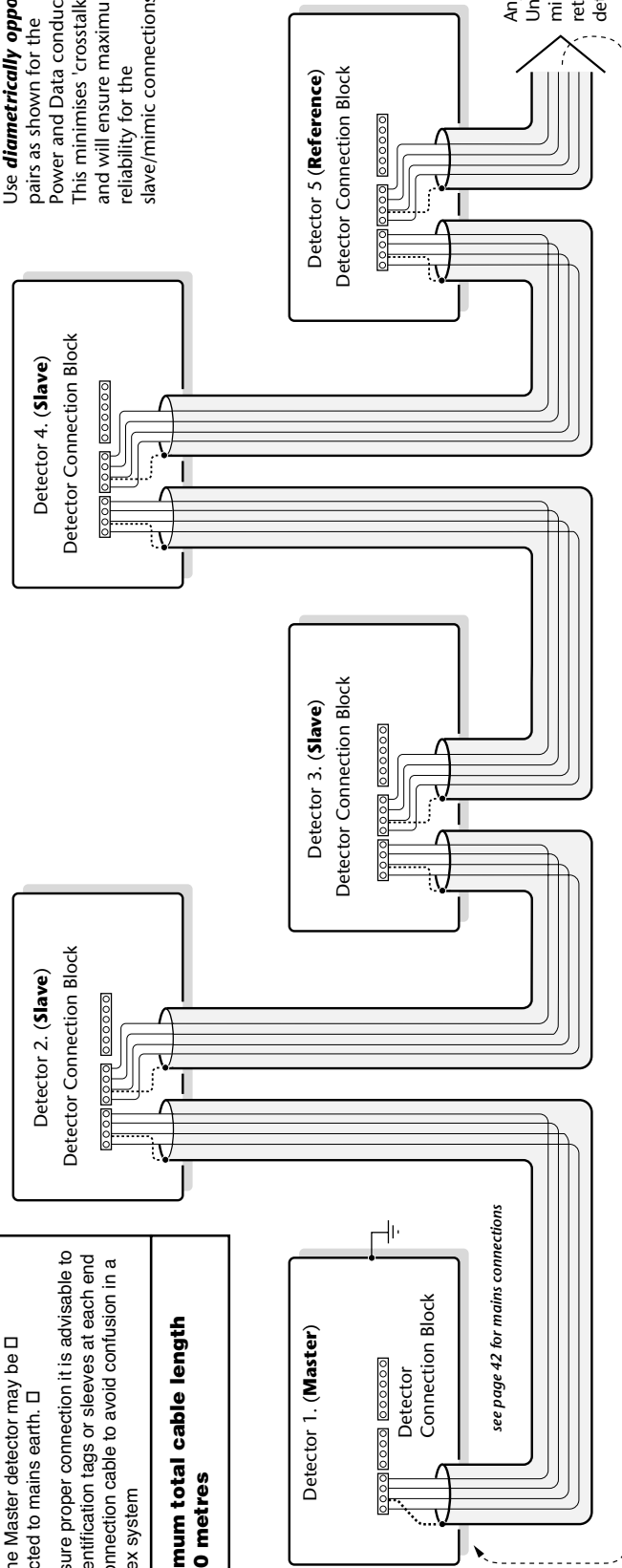


Use **diametrically opposed** pairs as shown for the Power and Data conductors. This minimises 'crosstalk' and will ensure maximum reliability for the slave/mimic connections.



Example of 'Daisy chain' connection for 'Detector 2 (Slave)' as shown below. The detector power and data lines are sent in parallel to two connection blocks for ease of installation.

**Particular care must be taken to ensure that the power lines (+24V and 0V) are connected correctly. Electrical continuity checks may be advisable before powering up the system.**



## Important Notes On Interconnection Cables

**Example of suitable slave loop cable type within UK**

- Pyrotech MICC Type CCM4L1.5 □ 4 Core, 1.5 mm or direct equivalent

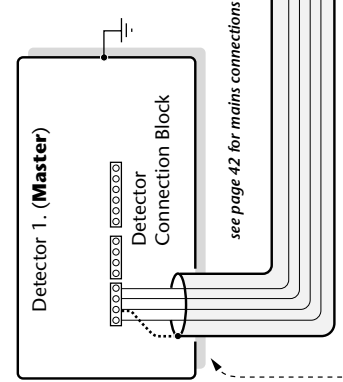
**Where non fire proof slave loop cable is used outside UK**

- All cables must be screened type. □
- Maximum capacitance conductor to screen is 120 pF (picofarads). □
- Minimum cross sectional area of slave loop □ conductors is 1.5mm<sup>2</sup>. □

**Slave loop cables**

- For cable runs of over 100m it is recommended that the overall screen is connected to 'Slave Loop 0V' and the detector case at each detector. □
- Cable joints are not permitted. □
- Only the Master detector may be □ connected to mains earth. □
- To ensure proper connection it is advisable to use identification tags or sleeves at each end of a connection cable to avoid confusion in a complex system

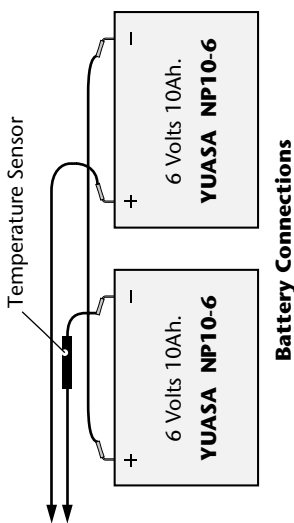
**Maximum total cable length is 200 metres**



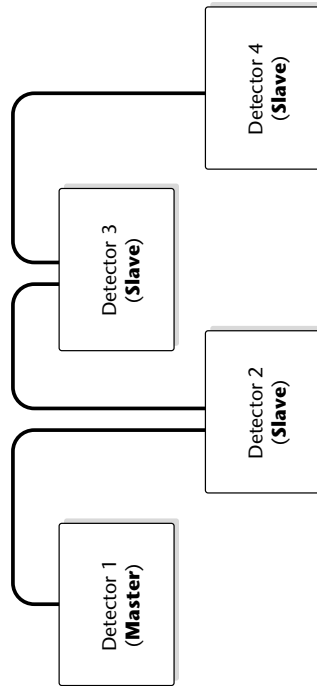
## Interconnection Methods

The detector 'Data Bus' must be configured in one of the following manners. These configuration types ensure maximum reliability for the transmission of data.

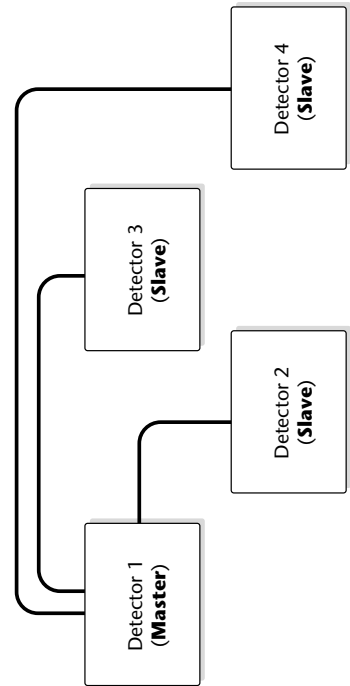
Ensure that any cable type is of lowest possible capacitance and take particular care to ensure that any connections are of the approved type.



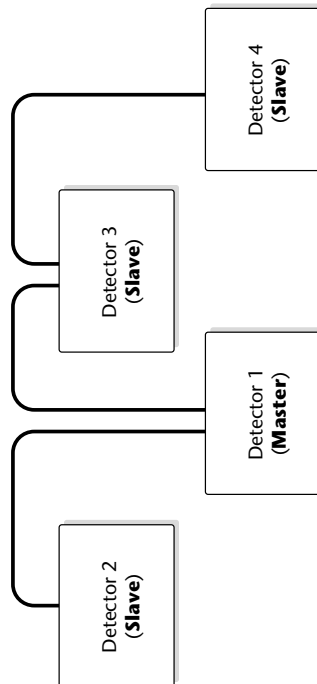
**OK** ✓



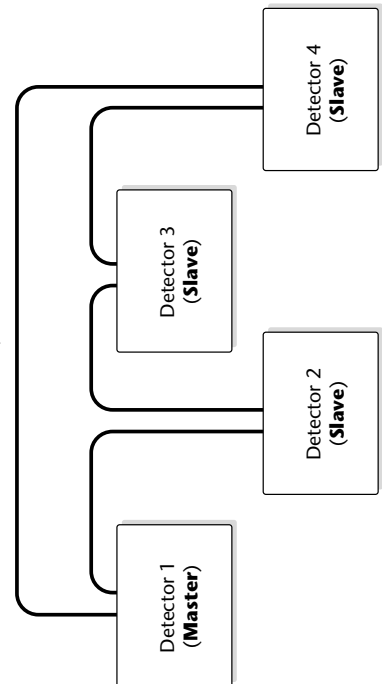
**INCORRECT** ✗



**OK** ✓



**OK** ✓



## Mimic Repeater Display & Connections

### Description

The mimic display for the detector consists of a self contained 2U high 19 inch rack mounting board upon which all of the detector front panel indicators are duplicated. Mimic controls consist of RESET, TEST and ISOLATE keys and these can be individually enabled or disabled as set for the master detector.

One mimic is used per master detector. Since the indicators on the mimic are the same as a master detector they will not be covered in detail here, other than to explain that the mimic can display information for up to a maximum of one master detector, three slaves and a reference detector.

The mimic panel is connected to the detector slave loop (data bus) using the same four core screened cable as a slave detector and receives all of its power from the slave loop. The mimic display also supports Power conservation mode, when all of the indicators dim to less than half brightness when the detector is running on battery backup supply.

**Note:** For mimic to operate, programmable function 49 (see page 21) must be set to 'y'.

**NB** 

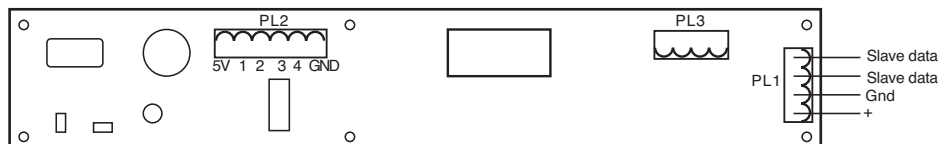
### Current consumption

Below is a table of the mimic current consumption for the mimic display in its various modes of operation.

Operating Mode	Current
Nominal	80mA
Maximum (all LEDs on)	150mA
Power save (with 12 Volt stand-by)	100mA
Nominal with external power (30 Volts)	50mA

### Connectors

The positions of the various connectors on the rear of the mimic board are shown below.



**PL1** -is the slave loop connection. This is the only connector on this board that is needed for the mimic to operate.

**PL2** -this connector is used for the optional mimic relay board.

**PL3** - is reserved for future expansion.

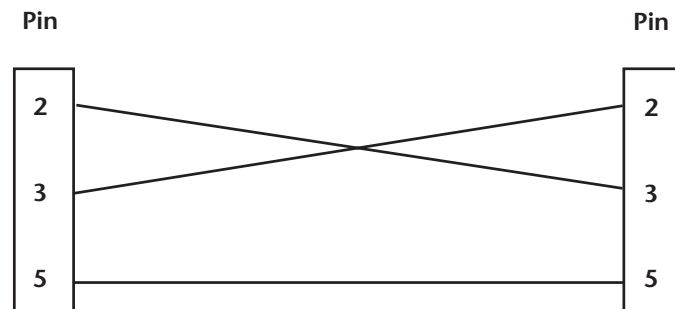
## Serial Port Connections

Pin	RS232 Use
1	not connected
2	Received data
3	Transmit data
4	not connected
5	Signal Ground
6	not connected
7	not connected
8	not connected
9	not connected

## Detector to PC Serial Cable Connections

9 Pin Female 'D' Connector

9 Pin Female 'D' Connector



## Demonstration Mode

As the detector normally takes 24 hours to reach full sensitivity, it is possible to short-cut this duration by placing the detector into Demonstration Mode. To do this, all three front buttons have to be depressed in the following sequence **WHILE THE DETECTOR IS IN FASTLEARN MODE**; Firstly press the top RESET key and hold it down. While depressing this key, simultaneously depress the lower two buttons marked TEST and ISOLATE. When this is done correctly, all front panel indicator LEDs will flash twice to show that Demonstration Mode is enabled.

From Firmware revision 3.0, if this mode has been entered, the Detector ON LEDs will flash to indicate that this condition is entered. The event is also stored in the internal log.

**NB** 

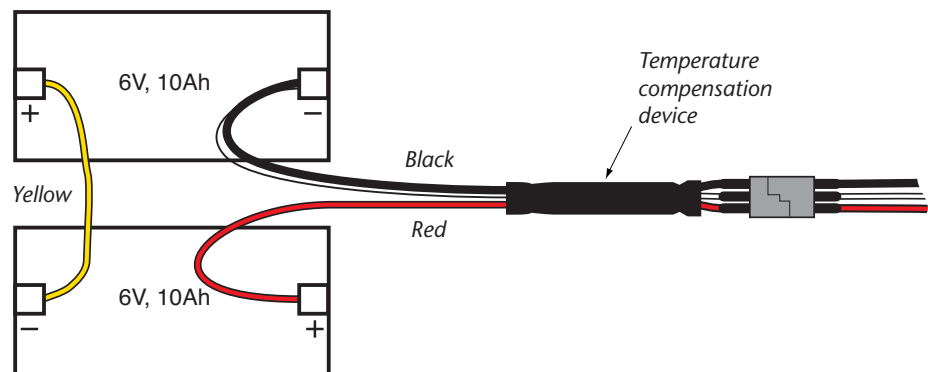
**Note** - Only use this facility during demonstrations. To remove demonstration mode a new FastLearn must be initiated.

## Installation and replacement of standby batteries

Ensure that only batteries of the correct type and capacity are used.

**Stratos-HSSD® requires 2 x 6 volt standby batteries when using the integral power supply. To avoid current surge, these should be connected with the detector powered up.**

The standard *Stratos-HSSD®* enclosure has been designed to accommodate two 6 volt, 10 amp-hour batteries. (Yuasa NP10 - 6). To connect internal standby batteries the red and black leads supplied should be connected as follows. The red lead should be connected to the red (+ or Positive) terminal on one battery and the black lead connected to the black (- or Negative) terminal on the second battery. The unused terminals of the two batteries should be joined using the yellow interconnect lead supplied.



## Connecting external batteries

**NB** 

When a larger standby battery capacity is required, 12 volt batteries can be mounted outside the *Stratos-HSSD®* in a suitable enclosure whilst retaining the standard *Stratos-HSSD®* power supply/battery charger. The charts on page 38 indicate the *net* capacity of battery required for various configurations of Master and Slave detectors.

When using external batteries it is important to retain the temperature compensation device supplied with the *Stratos-HSSD®* within the new battery compartment. The signal leads connecting the temperature compensation unit from the battery negative (- or black) must also be retained. To simplify the connection of external batteries a 1.5 metre battery extension lead set is available (Part no. 30092). Longer lead lengths can be manufactured and supplied upon request.

## Current Consumption from 12 Volt stand-by battery

The following sets of figures are given to enable calculation of the appropriate stand-by battery capacity for any of the given periods using factory default settings.

Factory default, which is set to enable the power save mode, gives longer stand-by periods due to power saving measures that include dimming the display lights and slowing the aspirator speed to minimum. Note that this has the effect of increasing the transport time and care must be taken to avoid excessive transport times into the detector. If power save mode makes the transport time excessive, then this mode may be disabled and figures are given for the required battery capacity in this case.

### Minimum Amp. Hour - 12 volt lead acid battery

Power Save mode	12 HOUR			24 HOUR		
	Yes	No	No	Yes	No	No
Aspirator speed	1	5	10	1	5	10
Master	8.2	13	18	17	26	36
Master + 1 Slave	13	19	28	26	38	56
Master + 2 Slaves	18	26	39	36	52	78
Master + 3 Slaves	23	34	50	46	68	100
Master + 3 S. + Ref.	28	41	61	56	82	122

### Currents drawn from a 24 volt supply

Aspirator speed	5	10
Master	0.44 A	0.59 A
Master + 1 Slave	0.69 A	0.98 A
Master + 2 Slaves	0.94 A	1.36 A
Master + 3 Slaves	1.19 A	1.77 A
Master + 3 S. + Ref.	1.44	2.18

Firstly remove and discard the mains supply fuse from the power supply board (shown in position 21. on page 8). Disconnect the green 3-way free socket from the plug on the Terminal board (shown in position 5. on page 7). Disconnect the three transformer wires from the free socket, insulate them, and secure away from working circuits. Connect the external 24 volts DC to the two outer terminals of the green free socket. These connections are not polarity conscious. Fit the socket back onto the plug on the terminal board. Functions 22 & 23 should both be set to 'n'.

**NB** 

**Note** - When an external 24 Volt power supply is required, it is important that no internal batteries are installed.

### Connecting an external 24 volt DC supply

## Maintenance

To offer greater assurance of reliability, systems should undergo routine service in accordance with the particular Regulations, Codes of Practice or Standards applicable to the Country or organisation wherein systems are installed.

In the UK there are two documents which give specific procedures for the servicing of fire detection systems. These are :- BS 5839: Part 1: 1988. (Section 4 - Servicing) and BFPSA Code of Practice for Category 1 Aspirating Detection Systems. (Section 30)

To enhance the recommended procedures, Stratos-HSSD® incorporates features which provide the Service Engineer with both current and historical information on the condition of the system. These are more fully described in earlier sections of this manual.

The Stratos® Remote Software package is supplied with every Master Stratos-HSSD®. When loaded into a portable computer this remote software allows the service engineer to check and, if necessary, modify all the programmable features of the detector from a remote position. It also gives access to a range of test functions and viewing options. All the information can be stored in the computer and hard copy produced for future reference. (See page 22 - Connection to a computer).

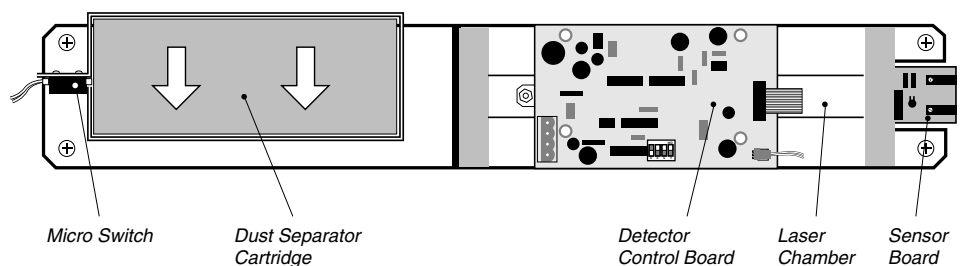
*The service engineer should take particular note of the following:*

**'Auto FastLearn Enable' - Function 52 on programmer.** During routine maintenance it is sometimes necessary to power down the system. To minimise the period during which the Stratos® is off line, this function should be set to 'n' (no).

**'Dust separator condition' - Function 51 on programmer.** This is an indication of the current condition of the dust separator. A new or clean separator would give a reading of '99' on the display. A separator which has reached the end of its useful service life would have a reading of '80'. The dust separator is continually monitored by Classifire® and appropriate adjustments made to the detector output as the separator becomes soiled and its ability to trap both dust and smoke increases. An independent 'Separator Renew' fault indication will be given when the output reaches '80'. By checking this and comparing it with previous information and the system application it is possible to determine whether or not the separator cartridge requires replacement. **Note: Routine visual inspection of the separator is not necessary.**

NB 

## Changing the Dust Separator



The separator body is formed in a material which is suitable for one duty cycle only and removal will cause damage to the separator cartridge. This is normal and the unit should be disposed of in a suitable manner after removal. When the cartridge is replaced a micro-switch is operated which initiates a FastLearn® routine. This allows the system to recondition itself to the marginally different efficiency of the new separator. The date and time of this service procedure will be recorded on the internal Stratos® historical log.

### Health & Safety Notice - Changing Air Filters

*Used air filters contain quantities of collected dust which, unless precautions are taken may expose maintenance personnel to a 'Nuisance Dust' hazard, as defined by the 'Control of Substances Hazardous to Health (COSHH) Regulations.*

*Maintenance personnel should therefore wear a mask/respirator, loose protective clothing and gloves when changing any filter.*

## Technical Data

Supply voltage	190 - 265 VAC (RMS) 95 - 132.5 VAC (RMS) 24V DC $\pm$ 5%	} <i>Depending on model number</i>
Case dimensions	430 x 324 x 160	
Weight (MASTER Stratos)	14.2 kg (18.2 kg with batteries)	
Weight (SLAVE Stratos)	10.8 kg	
Operating temperature range	-10 to +60° C	
Operating humidity range	0 - 90% Non Condensing	
Sensitivity range (Obsc./Metre)	Min. = 2% Max. = 0.04%	
Detection Principle	Forward Light Scattering Mass Detection	
Particle sensitivity range	0.0003 $\mu$ m to 10 $\mu$ m	
Dust Discrimination Principle	Paired Pulse Amplitude Type	
Current Consumption	100mA. @ 230VAC (RMS) 200mA @ 115 VAC (RMS) 470mA. @ 24V. DC.	} <i>Depending on model number</i>
Battery charge Voltage	13.6 V. @ 20° C.	
Battery charge current	3 Amp.	
Stand-by period	Min. = 0 Hrs. Max. = 72 Hrs.	
Maximum sampling pipe length	200 Metres total	
Sampling pipe internal diameter	15 - 25 mm	
Chamber service intervals	> 5 Years	
Dust separator service intervals	> 3 Years (depending on environment)	
Theoretical laser life	> 1000 YEARS	
Programming of unit	On-board programmer or PC	
Slave loop (Data Bus) cable	4 core screened 1.5 mm <sup>2</sup>	
Max. core to screen capacitance	120 pF	
Maximum slave loop length	200 Metres	
IP Ratings	Master IP50 Slave IP50	

## Product Safety

This instrument is Safety Class 1 according to IEC classification and has been designed to meet the requirements of BS EN 60950: 1992 (Safety of information technology equipment, including electrical business equipment). It is an Installation Category II instrument intended for operation from a single-phase mains supply.

This instruction manual contains information and warnings, which must be followed by the user to ensure safe operation and to retain the instrument in a safe condition.

Use of this instrument in a manner not specified by these instructions may impair the safety protection provided. Do not operate the instrument outside its rated supply voltages or environmental range.

### **WARNING! THIS INSTRUMENT MUST BE EARTHED.**

Any interruption to the mains earth conductor inside or outside the instrument will make the instrument dangerous. Intentional interruption of the earth conductor is prohibited.

When the instrument is connected to its supply, terminals inside the instrument may be live, opening the door and removing safety covers or removing any parts is likely to expose live parts.

Any adjustment, maintenance and repair of the opened instrument under voltage shall be avoided as far as possible and, if inevitable, shall be carried out only by a skilled person who is aware of the hazard involved.

If the instrument is clearly defective, has been subject to mechanical damage, excessive moisture or chemical corrosion the safety protection may be impaired and the apparatus should be withdrawn from use and returned for checking and repair.

Make sure that only fuses with the rated current and of the specified type are used for replacement. The use of makeshift fuses and the short-circuiting of fuse holders is prohibited.

The following symbols are used on the instrument and in this manual: -



**Caution** - refer to the accompanying documentation, incorrect operation may damage the instrument.



Alternating current.

## Mains Connections

### SUPPLY OPERATING VOLTAGE

The operating voltage of this instrument is shown on the protective cover fitted above the supply voltage connections.

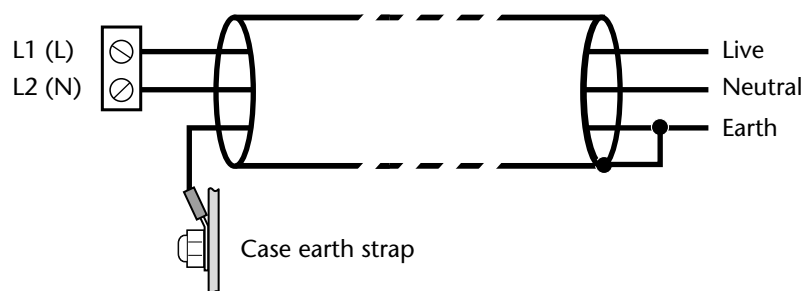
The instrument is supplied specifically for 230V operation, 115V operation, or 24V-dc operation. These voltage supply options cannot be changed once fixed by the manufacturer. The instrument contains a high speed transient protection device which is supply voltage dependent it is therefore important that the instrument is operated within its specified voltage limits, otherwise the protection device may be damaged.

### SUPPLY POWER LEAD

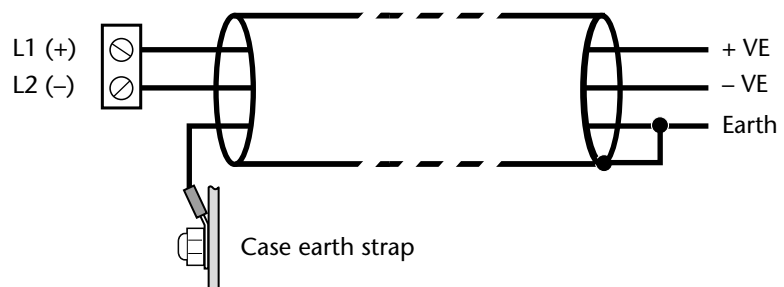
The instrument is supplied complete with a metal cable gland. To meet EMC requirements this metal cable gland together with a cable containing 3 cores plus an outer screen and outer insulation sheath must be used for mains wiring. The cable should have a core specification of 1.50mm<sup>2</sup> 30/0.25 and an overall sheath diameter of between 8 and 13mm.

*The mains power connections to the instrument should be made as follows: -*

#### For 115V or 230V



#### For 24V d.c.





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