



ADVANCED WARNING

SYSTEMS

FastSense PLUS



**High Sensitivity Detector
Installation and Operation**

MAN 1502-8

WORLD LEADER OF INNOVATIVE SOLUTIONS
IN FIRE DETECTION AND ALARM SYSTEMS



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1 Introduction

FastSense PLUS is a highly sophisticated 'next generation' High Sensitivity Aspirating Smoke Detection product that has been designed to ensure that installation and commissioning is as simple as possible, while optimising performance.

FastSense PLUS 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.

FastSense PLUS 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.

This equipment is Class 111 as defined in AS/NZS-3260:93 (i.e., this equipment is designed to operate from Safety Extra Low Voltages and does not generate any hazardous voltages).



This detector must only be installed by **FastSense PLUS** accredited installers.

This detector has an IP 50 rating and is not suitable for installation where it may be exposed to falling or spraying of any form of liquid or corrosive gases or chemical fumes.

The performance of the system is dependant upon the pipe network design. Any extension or modification to the designed network may alter the performance of the system. The correct operation of any such changes must be verified with the use of the **PipeCalculator**. **PipeCalculator** is available from your local Ampac Customer Service Office.

Conduit entries to the **FastSense PLUS** unit are designed for 27mm outer diameter conduit. When using 25mm outer diameter conduit ensure that the 27mm to 25mm adaptors provided with the unit are fitted.

As this equipment is part of a fire detection system, it should be supplied from an approved power supply conforming to AS4428 Part 5 or to NZ4512.



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, eg. for fuse replacement.



This label is located on the laser chamber at the bottom right of the open detector and signifies that the unit is a Class 1 Laser product as specified in IEC 60825-1 and AS2211. 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 studs (see sections 2.3 and 2.4). These are for grounding cable screens etc. and should not be connected to 0VDC or signal earth.

*Ampac has taken every care to ensure that **FastSense PLUS** is as simple to install as possible but in case of difficulty, please contact our **Local Customer Service Office** to ensure trouble free installation and operation.*

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



Note: Throughout this manual, where an entry is shown as Example, this is intended as a representation of the text appearing on the LCD screen on the detector (if fitted) when the option is selected, eg Setup menu. Entries shown as <EXAMPLE> represent function buttons on the front of the detector, eg. <TEST>.

2 Types of Detectors

2.1 Standard detector



The Standard Detector may be operated as a stand-alone unit, or may be part of a network of detectors centrally monitored by a Command Module (see section 2.2). It may be programmed via the front panel as in the version shown above. Alternatively, the detector may be programmed remotely via the detector's RS485 terminals using a Command Module, or via the detector's RS232 port using a PC running AMPAC's remote control software. A copy of this software is packed with each detector supplied. For details of programming a detector or Command Module with the remote control software, consult the Remote Software Guide.

2.2 Stand alone Command Module/ Command Module detector




When multiple detectors are networked together, a Command Module may be used to tie all the detectors together and to provide a central point for programming, running diagnostics and PC and fire panel connection.

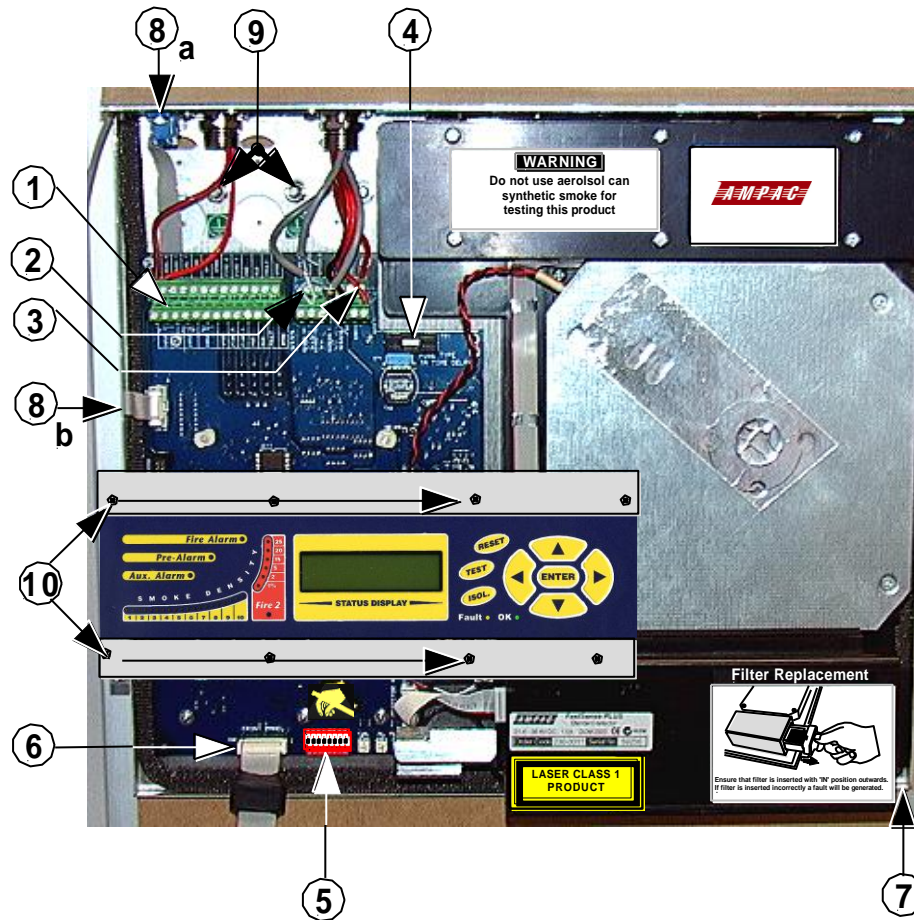
The Command Module can be mounted either inside a detector as shown or as a standalone unit in its own housing without an aspirator or smoke detection circuitry. If detectors attached to the Command Module are mounted in different fire zones then the Command Module must be mounted in its own housing with separate power supply to comply with AS4428 part 5 and NZ4512.

When a Command Module is mounted inside a detector, the standard detector display is replaced with a dedicated Command Module display. The programming buttons and display on the front of the detector belong to the Command Module.

Programming of the Command Module is very similar to programming a detector, the main difference being that the Command Module has extra functions to control all the detectors connected to the detector loop.

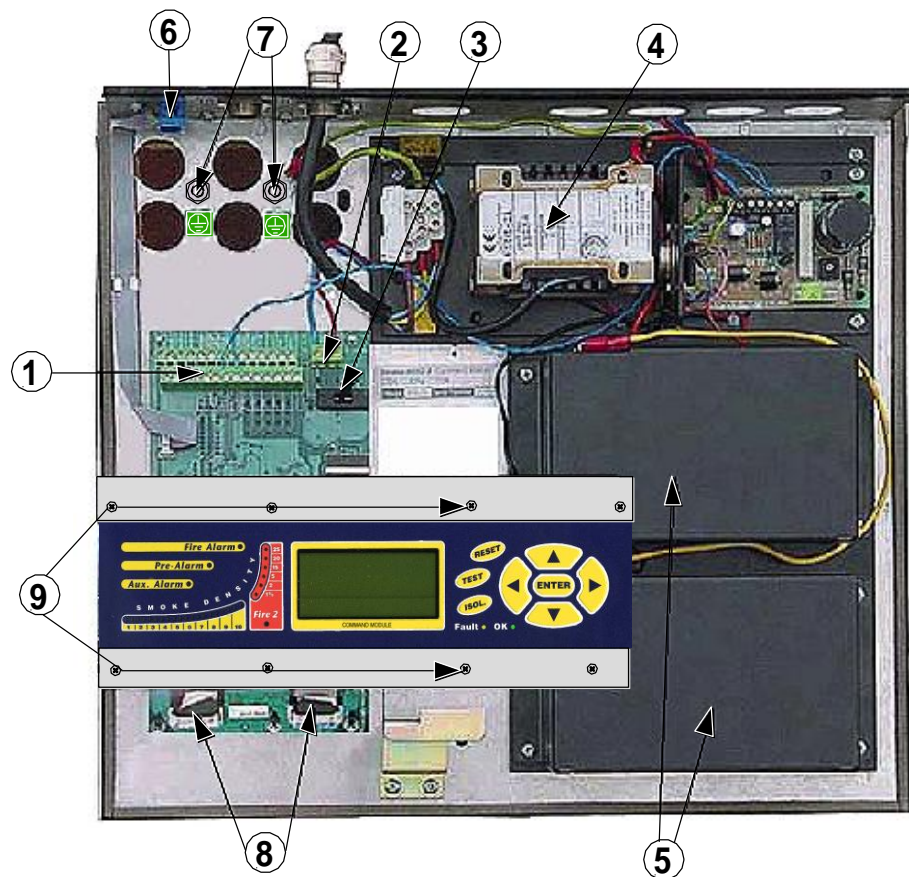
 **Note:** Throughout this manual, the term "FastSense PLUS detector" will apply equally to the Standard Detector and Command Module Detectors. Where a given feature or aspect applies to a specific model, this will be made clear in the text.

2.3 Standard detector interior view



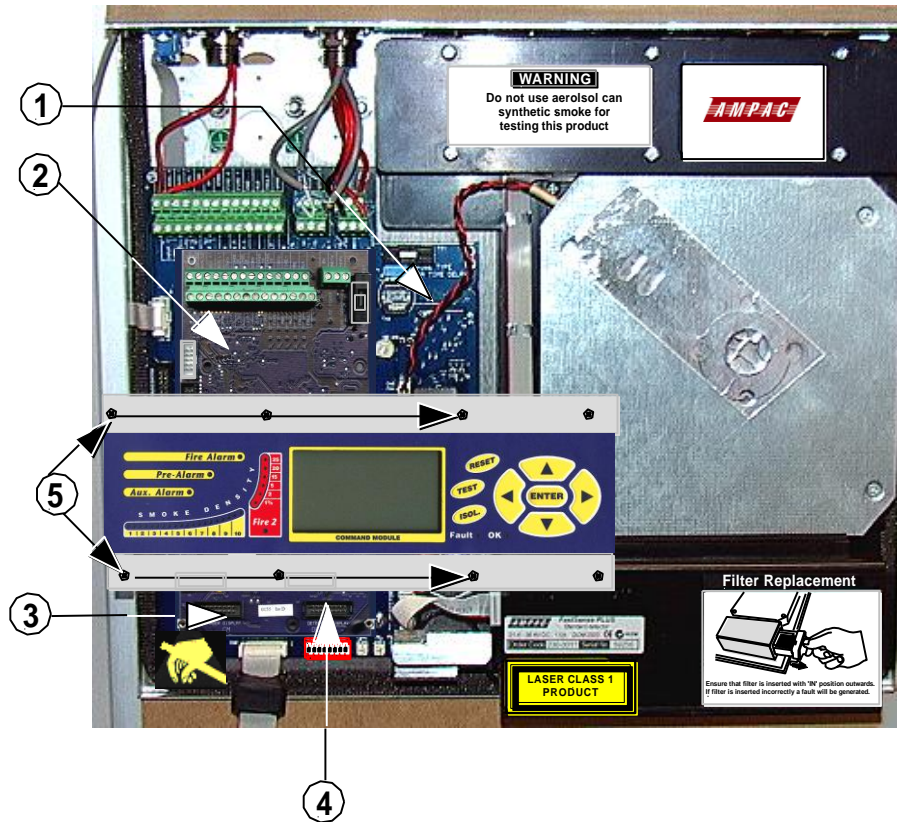
1. Terminal block connections (see section 6.3.1)
2. RS485 terminal connections (see section 6.3.1)
3. 24VDC power supply connections (see section 6.4.1)
4. 1A 5 x 20mm T-type protection fuse
5. Detector address DIP switch (see section 9.1)
6. Front panel display connector
7. Filter removal tab (see section 11)
8. a / b RS232 serial port (see section 9.5)
9. Safety earth studs (see section 6.4)
10. Display fixing screws (see section 6.2.1)

2.4 Stand-alone command module interior view



1. Terminal block connections (see section 6.3.2)
2. 24VDC power supply connections (see section 6.4.2)
3. 500mA 5 x 20mm T-type protection fuse
4. Internal power supply (see section 6.4.3)
5. Stand-by batteries (see section 6.4.4)
6. RS232 serial port
7. Safety earth studs (see section 6.4)
8. Front panel display connectors
9. Display fixing screws (see section 6.2.1)

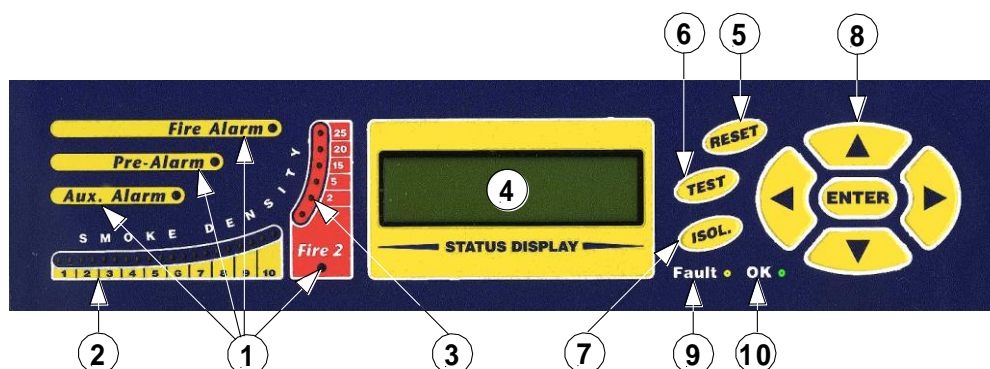
2.5 Command module detector interior view



1. Detector CPU board (see section 2.3)
2. Command Module CPU board (see section 2.4)
3. Command Module display connection
4. Detector display connection
5. Display fixing screws (see section 6.2.1)

3 Controls and Indicators

Standard detector



Command Module detector



1 **Aux, Pre-Alarm, Fire 1 and Fire 2** indicators illuminate when the appropriate alarm level has been reached and the appropriate time delays have expired. On a stand-alone Command Module, the indicators signify an alarm condition from any detector on the communications loop.

2,3 **Smoke density indicators.** This display is in two sections. The first part, labelled 1 to 10, is the relatively scaled ClassiFire® bargraph and changes in steps of half a segment. The second part displays absolutely scaled smoke levels above 1% obscuration per metre (% obs/m) to a maximum of 25% obs/m. The Fire 2 activation level is programmed normally somewhere in this range. The bargraph display will show a continually cycling pattern when the unit is in FastLearn mode. On the Command Module display, this will occur when any unit on the RS485 communications loop is in FastLearn. Otherwise, the bargraph display on the Command Module will mimic the bargraph display on the highest-reading detector on the loop.

4 **Status display** (if fitted). This display shows all events as they happen in real time and is also used to configure the unit. See Section 4, 'Programming the unit' for more information.


5 **RESET.** When enabled, pressing <RESET> will clear any latched alarms or faults and set the status display back to its normal operation display. To comply with national standards, detectors are supplied with the RESET function disabled as default.

6 **TEST.** When enabled, pressing <TEST> will start a lamp test and then the detector will show its nominal operating sensitivity as calculated by the ClassiFire Artificial Intelligence System.

7 **ISOL.** Pressing <ISOL> will toggle the unit's isolation state. When isolated, the unit cannot generate any alarms and will signal a fault condition and the text display will show **Panel Isolate**. To comply with national standards, detectors are supplied with the ISOL button disabled as default.

These three buttons can be individually enabled or disabled. The factory default state of the detector is for only the <TEST> button to be enabled and for <RESET> and <ISOL> to be disabled



These buttons, also referred to in the text as **menu buttons** are used when programming the unit, which is pass code protected. **See section 4, 'Programming the unit' for more information.**  Pressing or when not in programming mode (the access code has NOT been entered) will scroll through the detectors event log. **See section 8 'Event log' for more information.**

Fault. Illuminates when the unit has a fault and a fault signal is being sent to the fire alarm panel. On the Command Module, this also indicates a fault in a detector on the communications loop, or in the loop itself.

OK. Illuminates to show normal operation when there are no faults. On the Command Module this means that the Command Module and all detectors on the loop are operating normally.

As demonstrated below the standard detector display is a two-line LCD which allows basic programming of the detector.

3.1 Types of display

Latching faults

Enter Yes/No:Yes

As can be seen below the Command Module's display contains more information than that for the standard and prompts the user with the action expected by the use of graphic symbols.

Latching faults

Enter Yes/No:Yes



Press to change


For simplicity, the Standard Detector display will be used as the model for all LCD display examples applying to the detector. The Command Module graphic will only be used as an illustration when the function only applies to Command Modules.

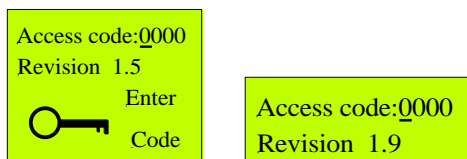
For simplicity, the Standard Detector display will be used as the model for all LCD display examples applying to the detector. The Command Module graphic will only be used as an illustration when the function only applies to Command Modules.

4 Programming the unit

4.1 Engineering Access code




It is not necessary to open the detector or Command Module case in order to program the unit. Programming of Standard Detectors or Command Modules may be carried out by using the front panel programming buttons. In addition to this, all detectors may be programmed remotely from a Command Module connected to the detector's RS485 terminals (see section 9.2) or from a PC running Ampac remote control software and connected to the detector's RS232 serial port (see section 9.5 and the Remote Software Guide).





In order to access the detector's programmable functions, it is necessary to enter the Command Module's or the Standard Detector's engineering access code. The default code is **0102**. To enter the code, press the <<ENTER>>  button on the Command Module or the Standard Detector to bring up the following screen:

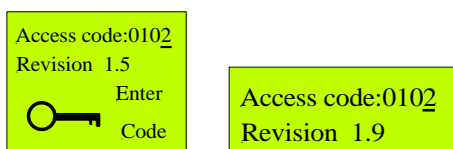


Command Module Standard Detector

The **Revision** and **Version** legends refer respectively to the revision level of the Command Module and Standard Detector firmware chip.

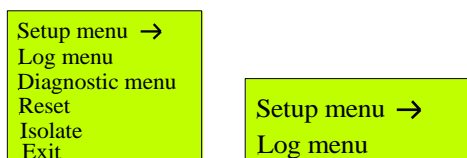
 **Note:** There is a horizontal cursor under the first digit in the code field. This means that the digit can be increased or decreased by using the <<up arrow>>  and <<down arrow>>  buttons respectively.

Assuming the default access code of 0102, the first digit is already correct. Pressing the <<right arrow>>  button will place the cursor under the second digit, and pressing the <<up arrow>>  button once will change this to "1". Press <<right arrow>>  twice (the third digit is correct, so does not need editing), and press <<up arrow>>  twice to change the last digit to "2". The screen should now appear as follows:



Command Module Standard Detector

Press <<ENTER>> to enter the code. The programmable functions are now available for editing, and the main menu screen appears as:



Command Module Standard Detector

The arrow next to the "Setup menu" entry indicates that this is the currently selected menu. To select a different menu, use the <<up arrow>> and <<down arrow>> buttons to move the arrow to the desired menu and press <<ENTER>> or <<right arrow>> to access the functions or sub-menus.

In the remainder of the document, examples of screen display will be shown for the Command Module only except where the screen applies only to Standard Detectors. The Standard Detector display has the same options, but without the Command Module's screen prompt graphics.

4.2 Overview of Programming Functions

4.2.1 Data entry

All the editable programmable functions are accessible in the same way as described in section 4.1, using the arrow buttons to place the cursor under the field to be edited, the <<up arrow>> and <<down arrow>> buttons to amend the value, and <<ENTER>> to accept the altered value. Four types of function are available:

Yes / No: Pressing the <<up arrow>> or <<down arrow>> button toggles the value between “Yes” and “No”. Example – **Latching alarms**

Numeric: <<left arrow>> and <<right arrow>> select the digit to be altered and <<up arrow>> and <<down arrow>> increment or decrement the value by one respectively. Example – **Access code**

Alphanumeric: <<left arrow>> and <<right arrow>> select the character to be altered and <<up arrow>> and <<down arrow>> step through the list of available characters. Example – **Device text**

Display: These functions cannot be edited and are for display purposes only. Example – **Flow pipe 1**

Entry: These functions do not belong to a sub-menu and are enabled by selecting the function and pressing <<ENTER>>. No editing is possible. Example - **Reset**

4.2.2 Applicability

A function may apply to a detector, a Command Module, both, or all detectors on the loop. Depending on the function, the user may be prompted for an address to which the function will be applied at either the sub-menu stage or at the function stage.

Detector: Applies only to detectors. The user is prompted for a detector address to which the function or all the functions within the submenu will be applied. Example – **Alarm levels**

CM: Applies only to Command Modules. Example – **BMS protocol**

Any: Applies to detectors or Command Modules. The user is prompted for a detector address from 001 -127, or 000 for a Command Module. Example – **Latching faults**

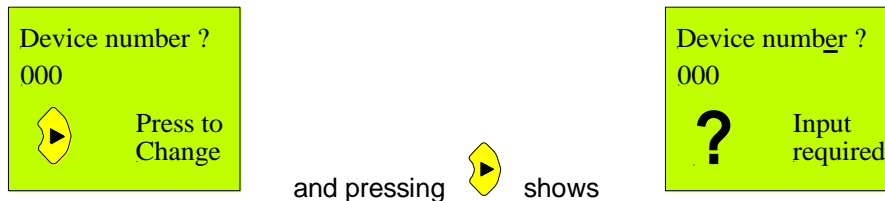
All: When entered on a Command Module, the function is applied to all devices on the loop. No detector address needs to be entered on the Command Module. Example: Date DD/MM/YYYY. If entered on a detector, only that unit is programmed.

4.2.3 Programming a Detector from a Command Module

A Command Module contains the full set of programmable instructions for detectors as well as those which apply to Command Modules. It can therefore be used to program any detector on the loop.

When a function or sub-menu applies to individual detectors, rather than solely to a Command Module, the user is prompted to enter a detector or Command Module address number. Detector addresses are in the range 001-127, and the address number 000 is reserved for the Command Module. Entering numbers outside this range, or entering address "000" for a function which does not apply to Command Modules, will cause the error message **Bad detector** to be displayed on the Command Module screen. The error message **No response** means that the Command Module cannot find a detector with that particular address.

The address number prompt may occur when a function is accessed, or when a given submenu is entered. The following screen is shown:

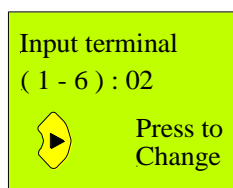


As in the example given in section 3.1, the horizontal cursor under the first zero indicates the currently selected digit. Press **<<up arrow>>** and **<<down arrow>>** to cycle through the digits from 0-9 until the correct value for the digit appears. Press **<<right arrow>>** to access the next digit and repeat until all three digits are correct, and then press **<<ENTER>>**. Note that address 000 only applies to the Command Module, and is used to program the Command Module itself.

When the relevant detector address is entered, the Command Module will access the relevant programmable functions in that sub-menu for the detector. Any changes made to these functions will apply only to the target detector. Where a Command Module is connected to only a single detector, it will only prompt for a device number to be entered if the sub-menu chosen could apply equally to a detector or a Command Module. In the case of functions that will be applied to all detectors on the loop, such as Reset, it will not prompt the user for a device number.

4.2.4 Remote functions

Certain functions, e.g. **ClassiFire override** (see section 4.3.4) are classified as remote functions. This means that the function is activated or toggled by a short circuit across the remote input terminals (see section 6.3.1 and 6.3.2). When enabling the function, the user is prompted for an input terminal to which the function will apply, as in the example below.



Values of 1 to 3 correspond to a detector's INPUT 1 to INPUT 3 terminals respectively (see section 5.3.1), and 4 to 6 correspond to input terminals "I/P 1" to "I/P 3" on an optional relay / input card. For remote functions that apply to Command Modules, the range of terminal numbers is the same, except that the Command Module only has two remote inputs (see section 6.3.2). Remote input 3 therefore does not apply, with 1 and 2 corresponding to the Command Module on board remote terminals, and 4 to 6 to relay/input remote terminals

The terminal proposed for the function (terminal 2 in the above example) will normally be the next unassigned input, in order to avoid a possible clash of functions. However, multiple remote functions can be assigned to a single terminal and the unit does not give a warning that the selected input terminal is already assigned to another remote function, so take care that the functions do not 'clash'. This should, in any case, be obvious when wiring up the terminals.

4.3 List of programmable functions

As an example, each function will be recorded as follows

Time and Date (All, Numeric)

Menu: **Setup menu**

Submenu: **Time and date**

Function(s): **Time HH:MM**

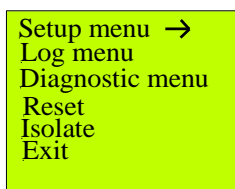
Date DD/MM/YYYY

All means that the functions in the Time and Date submenu of the Command Module's **Setup menu** are sent from the Command Module to all devices on the loop. On a standard detector, only that detector is programmed

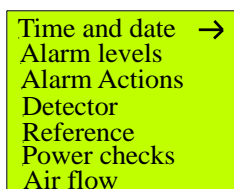
Numeric means that the functions' values are single or multiple digits, with each digit being in the range 0-9.

The legend(s) shown next to **Function(s)** are the names of the function or functions as displayed on the Standard Detector or Command Module screen, including the allowable range of entries for numeric functions, or **Yes/No** as appropriate. The function names may be in the form of abbreviations due to the 16-character width of the Standard Detector and Command Module LCDs.

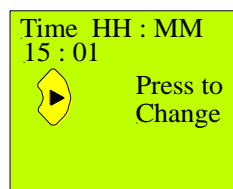
To access the functions in this example, you would enter the engineering access code (see section 4.1) to access the main menu screen. Pressing **<<ENTER>>** twice will show the menu, submenu and functions list as follows:



Menu Screen



Sub Menu Screen



Function Screen

4.3.1 Time and date (All, Numeric)

Time and Date (All, Numeric)

Menu: **Setup menu**

Submenu: **Time and date**

Function(s): **Time HH:MM**

Date DD/MM/YYYY

All detectors are equipped with a battery backed-up Real Time Clock (RTC), which assigns times and dates to events stored in the event log (see section 4.3.41) and to chart recordings (see section 4.3.33). It is also used to control day/night switching (see section 4.3.6). The RTC battery is rechargeable, and so will not require replacement under normal circumstances. If the battery or the RTC circuitry fails for any reason, the unit will generate an **RTC fail** fault and events will be assigned incorrect times and dates.



Note: *Resetting the time and date will reset the chart recording, beginning the chart at the new time and date. The event log is not erased, and old entries will still be referenced to the time and date settings in force when the events occurred.*

Detectors are dispatched with the RTC set to the current UK time and date. In order to ensure that recorded and timed events conform to local time, it is important that the **Time and date** functions be set appropriately for the time zone of the protected area. Note that changes to the clock settings should not exceed + 70 minutes unless a FastLearn is initiated in order to ensure that day/night switching operates correctly. (Changes of less than 70 minutes are automatically factored into the day/night switching, so a new FastLearn is not required under these circumstances.)

It should be noted when editing the time and date functions that the cursor does not ignore the date and time separators and so the **<<right arrow>>** button must be pressed again to move across these, e.g. when moving from the hours field to the minutes field in the **Time** function.



Note: *The Date function only uses DAY/MONTH/YEAR date format, and this must be noted when entering dates. The Time function uses only a 24-hour time format.*

The software performs no error trapping on the values selected until the **<<ENTER>>** button is pressed. Therefore, an incorrect date entry, e.g. 01/31/04, can be entered, but it will cause **Bad date** to be displayed on the Command Module screen. An invalid time entry, e.g. 24:01, will show **Bad time**.



Note: *If the unit's memory reset link is removed and replaced (see section 13.10), the Time setting will revert to 00:00 and Date to 01/01/00.*

4.3.2 Fire alarm levels (Detector, Numeric)

Menu:	Setup menu
Submenu:	Alarm levels
Function(s):	Fire 2 level (1-25) Fire 1 level (8-10) PreAlarm level (3-8) Aux level (1-25)

Detectors incorporate two classes of alarm levels, *relatively scaled* and *absolutely scaled*.

The relatively scaled alarm levels are specified relative to the mean of the smoke distribution of the normal working environment, set up during the unit's 24-hour learning period. The ClassiFire software calculates the standard deviation (SD) of the distribution and sets up a virtual bargraph divided into equal segments with zero as the mean of the normal smoke distribution and ten as a set number of standard deviations away from the mean of the distribution. This bargraph is the basis for the placement of the alarm levels and also the bargraph display on a Command Module or Standard Detector display. Thus, a Fire 1 alarm level of 8 indicates that the alarm will be generated when the mean sampled smoke distribution reaches 8 on the bargraph (virtual or displayed). Minimum Display detectors do not have a bargraph display, but the virtual bargraph is still used to set the relative alarm flags. A major advantage of the relatively scaled alarms is that the normal background smoke distribution, no matter how high, does not give any indication on the bargraph.

Thus the full bargraph is available for abnormally high smoke densities, and any bar-graph indication will imply smoke levels above the normal range. This ensures that nuisance alarms are kept to an absolute minimum. The actual range of smoke density covered by the bargraph is determined by the detector's ClassiFire artificial intelligence algorithms and the ClassiFire alarm factor (see section 4.3.5). On *absolutely scaled* detectors with bargraph displays, the bargraph will always indicate any smoke present, regardless of whether this is a normal condition. In atmospheres that are normally highly polluted, the detector may only need an insignificant increase in smoke level to indicate a fire condition.

The *relatively scaled alarm levels* for detectors are:

Fire 1 level: Bargraph range settable from 8-10, default setting 8. The detector sensitivity displayed when the detector's <<TEST>> button is pressed is the absolute sensitivity of this alarm level in % obs/m.

PreAlarm level: Bargraph range settable from 3-8, default setting 6. This is used as an early warning of an incipient fire.

Aux level: Bargraph range settable from 2-10, default setting 10. At the lower setting, this could be used as a very early warning of a possible incipient fire. At the default setting, it will occur after the Fire 1 alarm and can be used as a fire alarm confirmation.

Detectors also incorporate a single absolutely scaled alarm. Rather than a bargraph setting, the value set in the **Fire 2 level** function indicates that an alarm will be generated when the smoke density at the detector rises above a certain level, regardless of the ClassiFire alarm setting (see section 4.4.5). Command Modules and Standard Detectors have a secondary bargraph display showing the absolute smoke density in percentage obscuration per metre (% obs/m) from 1% to 25% (see section 3). The value set in the **Fire 2 level** function directly equates to this, i.e. a **Fire 2 level** setting of 5 indicates that the Fire 2 alarm relay will trip when the smoke density at the detector reaches 5% obs/m.



Note: *The smoke density in the protected area will be heavily diluted by the time it reaches the detector by fresh air drawn into the detector by sampling holes outside the protected area. Therefore, in a system with 20 balanced sampling holes and a Fire 2 setting of 10, a single sampling hole would need to see 200% obs/m before the detector would generate the alarm. This is impossible. Therefore, the Fire 2 alarm relay should be employed only in systems with small numbers of sampling holes, or multiple sampling holes in a common area in order to increase the smoke concentration at the detector.*

Detectors and Command Modules incorporate individual alarm relays for each alarm level (see section 6.3.1 and 6.3.2). The alarm signals are relayed to the Command Module via the RS485 bus, and also through the addressable bus terminals when an APIC card is fitted (see section 12.1).

4.3.3 Fire Alarm Time Delays (Detector Numeric)

Menu: **Setup menu**
Submenu: **Alarm levels**
Function(s): **Fire 2 delay (0-90)**
 Fire 1 delay (0-90)
 PreAlarm delay (0-90)
 Aux Delay (0-90)

These functions set the delay, in seconds, between the smoke density seen at the detector exceeding the relevant alarm threshold and the relevant alarm signal being sent. If the smoke level drops below the alarm level during this time, the alarm signal is not sent.

If the Cascading alarms function is enabled, (see section 4.3.11), then the Pre-Alarm and Fire 1 delays are cumulative, i.e. the detector will not begin to count down the Fire 1 delay until the PreAlarm delay has passed.

The default delay setting for all alarms is 5 seconds.

4.3.4 ClassiFire Override (Detector, Numeric)

Menu: **Setup menu**
Submenu: **Alarm levels**
Function(s): **Class override (0-99)**

This is a remote function (see section 4.2.4) requiring a short circuit across a remote input terminal to activate.



Note: only the "INPUT 3" terminal can be used with this function. When the input terminals are shorted together, the detector output is immediately reduced by the specified amount, i.e. if the Fire 1 alarm is at 14% of detector output and ClassiFire Override is set to 15, the **Fire 1** alarm threshold will move to 29% output when the

"INPUT 3" terminals are shorted together.

This may be used to prevent unwanted alarms being generated during expected periods of elevated smoke level, e.g. when opening an incinerator door. Ensure that the INPUT 3 terminals are not being used for any other function, e.g. remote day/night switching (section 4.4.14) or remote reset (section 4.4.15).

To set up the system, read the detector output in the **Detector read** function (see section 4.3.43) or by using the remote control software. Note the increase in output caused by the event and enter this number into the **Class. override** function. In the case of the opening of an incinerator door, the INPUT 3 terminals could be linked to an interlock switch on the door so that they could close automatically when the door was opened. The detector sensitivity would thus automatically be reduced to prevent an unwanted alarm as soon as the door was opened, and that normal sensitivity was resumed when it was closed. The default value for this function is zero. The range of settings is between 000 and 099 if the detector board's onboard "INPUT 3" remote terminal is used.

Entries in the range 100-199 may be entered, indicating output desensitisation of between 0 and 99% output using an optional relay / input board "I/P 3" terminal, or remote terminals on an APIC card, if the card supports it.

The function may be activated by a key-switch, latching push button or any other device that has volt-free short circuit contacts when activated.



Note: *If using a manual switch, be sure to open it when the smoke-generating event is finished in order to regain full sensitivity.*

4.3.5 ClassiFire Alarm Factor

Menu: **Setup menu**
 Submenu: **Alarm levels**
 Function(s): **Alarm factor (0-8)**

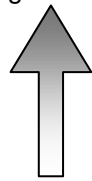
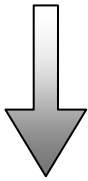
This function statistically determines the maximum sensitivity of the detector's relatively scaled fire alarms, based on the normal smoke distribution ascertained during the detector's 24-hour learning period. The alarm factor specifies how closely the alarm flags may approach the mean of the smoke distribution in terms of standard deviations (SD). The lower the factor, the smaller the number of SD's between the mean smoke density and the alarm flags, i.e. the narrower the range of smoke density covered by the detector's internal bargraph and the more sensitive the detector. The ClassiFire alarm factor determines the maximum sensitivity that the fire alarms may reach, based on the mean and the variance ("spread") of the ambient smoke distribution in the protected area. The detector constantly monitors the ambient smoke distribution in order to maintain the same statistical separation between the mean of the distribution and the alarm flags, thus the detector is constantly fine-tuning the alarm sensitivity. However, it should be noted that the sensitivity adjustment process takes place over a 24-hour time span, whereas detection of fires is a much faster-acting process. The detector has been tested and proven to maintain its alarm sensitivity sufficiently to ignore a very slowly growing fire whose smoke density builds up to the initial alarm level over several hours, much more slowly than most real-life fires.

The ClassiFire artificial intelligence routines use established statistical techniques to keep nuisance alarms at a minimum level, compatible with the selected sensitivity range. It should be noted that, for any given area, a reduction in the alarm factor value will increase sensitivity but will lead to an increase in nuisance alarms. Immunity from nuisance alarms may be a major consideration.

When selecting the appropriate ClassiFire alarm factor to be used in a protected area, consideration needs to be taken of the relative cost of a minor fire versus the costs of call-out in the event of a nuisance alarm. It might seem desirable to have the most sensitive setting possible in all environments, but the inconvenience of frequent nuisance alarms in a normally polluted area might be considerable. Thus, in an electronics clean room, a minor amount of smoke pollution could cause considerable loss and expense, which would outweigh the costs of an occasional nuisance alarm, and so the maximum sensitivity setting would be appropriate. Also, due to the tight environmental controls in such areas, nuisance alarms would be highly unlikely. However, using such a low alarm factor setting in a factory would be very likely to cause frequent nuisance alarms due to the high variability of contamination in the protected area.

During the 15 minute FastLearn period, the ClassiFire software will assess the mean of the protected area's background smoke distribution. If this is above a certain level, then the detector will start a new FastLearn at the next less sensitive alarm factor at the end of the 15-minute period, e.g it will change from alarm factor 0 to alarm factor 1. In a very polluted area, this may happen more than once and it may appear that the detector is permanently left in FastLearn mode.

Suggested settings of ClassiFire alarm factors for different areas are shown below:

Alarm Factor	Sensitivity	Immunity from Nuisance Alarm	Suggested Protected Area
0			Semiconductor manufacturing room
1			Computer room
2			Non-smoking office
3			Clean factory
4			Warehouse
5			Machine Shop
6			Warehouse with diesel trucks operating
7			Machine shop with diesel trucks operating
8	Lower	Higher	Machine shop with diesel trucks operating

4.3.6 Hours of Day/Night (Active/Inactive) Operation (Detector, Numeric)

Menu: **Setup menu**
Submenu: **Alarm levels**
Function(s): **Day start (0-23)**
 Night start (0-23)

These values are the time, to the nearest hour, at which the detector will switch between day and night operation. Entries are made in 24-hour format, e.g. 19 for 7 pm. If no day/night switching is required, both values should be set to 00.

Day/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.

The default settings for **Day start** and **Night start** are 08 (8 a.m.) and 19 (7 p.m.) respectively.



Note: The terms “day” and “night” are used for convenience. The more accurate terms would be “active” and “inactive” or “occupied” and “vacant” periods. Thus, if a protected area was more contaminated at night (such as in a night club), the detector would be running at reduced sensitivity in the evening and increased sensitivity during the day. The assessment of the required sensitivity level during the two time periods is carried out automatically during the detector’s initial learning period, and the system will automatically compensate for 1-hour seasonal time changes. If the smoke level does not change as expected, e.g. because of a change to 24-hour working, or during holiday periods, the detector will not switch over to the alternative sensitivity setting, thus maintaining optimum sensitivity at all times.

4.3.7 Laser Dust Discrimination (Detector Yes / No)

Menu: **Setup menu**
Submenu: **Alarm levels**
Function(s): **LDD enable Enter Yes/No**

When this function is set to **Yes**, 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 **No**. 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. This function is enabled by default.

4.3.8 Initiate FastLearn (Detector Yes / No)

Menu: **Setup menu**
Submenu: **Alarm levels**
Function(s): **LDD enable Enter Yes/No**

If the detector is in FastLearn mode, setting this function to **No** will stop the FastLearn process. Using the function in this way is neither recommended nor supported by Ampac.

Setting this function to **Yes** will start a FastLearn at any time. The bargraph display on the front of the detector will show a rolling segment display on the front panel for the fifteen minutes that it takes to complete.

The text display will initially display the legend **FastLearn 15** and will then count down each minute until the FastLearn is complete.



IMPORTANT NOTE It will take a further 24 hours after the FastLearn for full sensitivity to be reached, unless Demonstration Mode has been initiated. 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, set this function to Yes or power down and restart the detector to initiate FastLearn mode.

4.3.9 Automatic Fastlearn on Power Up (Detector, Yes / No)

Menu: **Setup menu**
Submenu: **Alarm levels**
Function(s): **LDD enable Enter Yes/No**

When this function is set to **Yes**, the detector will start a new FastLearn activity and reset the airflow fault parameters (see sections 4.3.32) whenever the detector is powered down and then powered up again. This is the default setting. If the detector is moved to another location, or if the sampling pipe layout is altered, it is important that these activities are carried out in order to optimise the detector response.

However, if the detector is powered down for any other reason, e.g. for site maintenance purposes, and it is highly likely that the ambient contaminant levels will be the same on subsequent detector power-up, it may be undesirable to wait 24 hours for the detector to optimise itself to the same environment. Under these circumstances, the function can be changed to **No** to circumvent the re-learning process. The detector will then retain its existing sensitivity and airflow parameters when it is powered up.

4.3.10 Fire Alarm Time Delay Override (Detector, Yes / No)

Menu: **Setup menu**
Submenu: **Alarm actions**
Function(s): **Delay override Enter Yes/No**

If this function is set to **Yes**, then the detector will override any pre-set alarm delays (see section 4.3.3) if the smoke level rises to above the detector's Fire 1 alarm level before the PreAlarm time delay has expired. This minimises delay in response to rapidly growing 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.

4.3.11 Cascading Alarms (Detector Yes / No)

Menu: **Setup menu**
Submenu: **Alarm actions**
Function(s): **Cascading alarms Enter Yes/No**

Setting this function to **Yes** means that only when the detector's controller has gone into **Pre-Alarm** does the controller start counting down the main **Fire 1** 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 disabled by default.

4.3.12 Latching Alarm Relays (Any, Yes / No)

Menu: **Setup menu**
Submenu: **Alarm actions**
Function(s): **Latching alarms Enter Yes/No**

When this function is set to **Yes** it requires a reset from the front panel or a remote reset to clear fault indications. This is the factory default setting. It may be applied to the Command Module or a Standard Detector. This function is disabled by default.

4.3.13 Latching Fault Relays (Any, Yes / No)

Menu: **Setup menu**
Submenu: **Alarm actions**
Function(s): **Latching alarms Enter Yes/No**

When this function is set to **Yes** it requires a reset from the front panel or a remote reset to clear fault indications. This is the factory default setting. It may be applied to the Command Module or any Detector. This function is disabled by default.

4.3.14 Remote Day / Night Switching (Detector, Yes / No)

Menu: **Setup menu**
Submenu: **Alarm actions**
Function(s): **Remote day/night Enter Yes/No**

This is a remote function (see section 4.2.4).

This function allows the detector to be manually toggled between day and night operation (see section 4.3.6) 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. The day/night setting reverts to the previous state when the contacts are opened. The function could be activated by a key-switch, latching push button or any other device that has volt-free short circuit contacts when activated.

Setting the function to Yes overrides any day/night switch-over times previously set in Day start and Night start (see section 4.3.6).

4.3.15 Remote Detector Reset (Any, Yes / No)

Menu: **Setup menu**
Submenu: **Alarm actions**
Function(s): **Remote isolate Enter Yes/No**

This is a remote function (see section 4.2.4).

The function allows latching alarms or faults (see sections 4.3.12 and 4.3.13) to be remotely reset when the relevant activating terminals are shorted together. On a Command Module, shorting the activating terminals resets all detectors on the communication loop. The function does not override the operation of the front panel <<RESET>> button on the Command Module, if this button is enabled (see section 3.3.24), or the Reset option in the main programming menu (see section 4.3.50).

If the RESET button on the Standard Detector or Command Module is disabled (default condition – see section 4.3.24), this means that latching alarms or faults can only be reset from the remote function or the Reset function in the main menu (see section 4.3.38). The remote reset function could be activated by a key-switch, latching push button or any other device that has closed contacts when activated.


4.3.16 Remote Isolate (Any, Yes / No)

Menu: **Setup menu**
Submenu: **Alarm actions**
Function(s): **Remote isolate Enter Yes/No**

This is a remote function (see section 4.2.4).

The function prevents the detector or Command Module from sending fire or fault warnings to the connected fire panel when the relevant activating terminals are shorted together. It may be used during detector maintenance or smoke testing. The function does send a fault signal to a connected fire panel to indicate that the unit is Isolated, but will not send further fault indications until the unit is de-isolated.

If the <<ISOL.>> button on a Standard Detector is disabled (default condition – see section 4.3.24), this means that the detector can only be isolated by the remote function or by the Isolate function in the main menu (see section 4.3.49). The function could be activated by a key-switch, latching push button or any other device that has closed contacts when activated. When a unit is isolated, the FAULT light will be illuminated on the detector and Command Module and the message **Panel Isolate** will be displayed on the LCD display, if applicable. Opening the activating terminals will cause the LCD message to be replaced with **Panel de-isolate**.

 **Note:** *If latching faults are set (see section 4.3.13) then the detector will need to be reset to clear the fault condition.*

4.3.17 Programmed Isolate (Any, Yes / No)

Menu: **Setup menu**
 Submenu: **Alarm actions**
 Function(s): **Prog isolate Enter Yes/No**

When set to **Yes**, the detector will not generate alarms and will not indicate a fault condition on any fire panel which is connected, e.g. for detector maintenance. When applied to a Command Module, it disables the Command Module fire and fault relays but does not disable any APIC (addressable bus) communications. When a unit is isolated, the **FAULT** light will be illuminated on the detector or Command Module and the message **Panel Isolate** will be displayed on the Command Module LCD display, if applicable. Opening the activating terminals will cause the LCD message to be replaced with **Panel de-isolate**. Note that if latching faults are set (see section 4.3.13) then the detector or Command Module will need to be reset to clear the fault condition. The function does not override the operation of the front panel **<<ISOL.>>** button.



Note: *The function differs from the front panel **<<ISOL.>>** button, the main menu Isolate function and the Remote Isolate function in that these functions generate a fault at the panel whereas Programmed Isolate does not. For this reason, it is strongly recommended that the unit is manually de-Isolated as soon as possible rather than waiting for the 7 day period to expire.*

4.3.18 Number of Detectors (CM, Entry / Display)

Menu: **Setup menu**
 Submenu: **Detector**
 Function(s): **<<XYZ>> Detectors**

This function does not apply to detectors. When entering the Detector submenu, the Command Module will immediately show the number of detectors found on the RS485 communications loop. The function cannot be edited.

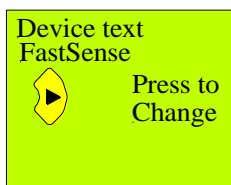
4.3.19 Device Text (Any, Alphanumeric)

Menu: **Setup menu**
 Submenu: **Detector**
 Function(s): **Device text**

This function enables the user to give a unique identifying name to a detector or Command Module. If left at the default settings, a detector will report an alarm or fault to a Command Module only under its detector address number, which will be displayed on the Command Module LCD. However, the Device Text function may be changed to any appropriate 16-character identifying label, e.g. Computer Room 1, a telephone number to call, or the name of a person responsible for the protected area, for ease of identification when multiple detectors are connected to a single Command Module.

When a detector's device text is changed from the default setting, the Command Module will then attach this label to any alarm or fault condition from that detector, instead of the detector address. Thus, even though Minimum Display Detectors do not have an LCD display they may be assigned individual device texts for ease of identification on the Command Module LCD when alarms or faults occur.

On accessing the function, a screen will appear on the LCD display similar to the one below for the Command Module:



To program the function, place the cursor under the first character by pressing the **<<right arrow>>**, and use the **<<up arrow>>** and **<<down arrow>>** to scroll through the available characters until the desired character is found. Then use the **<<right arrow>>** arrow to select the next character, and so on. When the desired text has been set, press the **<<ENTER>>** button to save it.

In order for a Command Module to display the chosen device text(s) with alarms and faults, it is

necessary to set the **Scan devices** function on the Command Module to **Yes** (see section 4.3.37).



Note: A Command Module does not amend the device text with unique identifiers when two detectors are set to the same device text setting, except in the default condition. This allows the same name or telephone number to be used for multiple areas.

4.3.20 Reference Detector Enable (Detector, Yes / No)

Menu: **Setup menu**
Submenu: **Reference**
Function(s): **Reference enable Enter Yes/No**

There may be occasions when external pollution enters a protected area and it is undesirable to generate a fire alarm, such as smoke from an external furnace entering the open doors of a factory. A reference detector can be used to “back-off” such a spurious external smoke reading to prevent detectors inside the protected area from generating unwanted alarm signals. In the rest of these sections 4.3.20 to 4.3.23, “reference” will mean a reference detector, and “detector” will mean a smoke detector inside the protected area. Any detector in a network may be set as a reference.

Setting **Reference enable** to **Yes** enables the reference. The function is disabled by default, meaning that no referencing is applied.

4.3.21 Reference Detector Address (Detector, Numeric)

Menu: **Setup menu**
Submenu: **Reference**
Function(s): **Reference device (1-127)**

The value entered into the **Reference detector** function corresponds directly to the address (as set on the detector’s internal DIP switch) of the detector to be used as a reference.

4.3.22 Reference Desensitisation Factor (Detector, Numeric)

Menu: **Setup menu**
Submenu: **Reference**
Function(s): **Level (0-99)**

The Level function reflects the fact that smoke seen at a reference may be diluted by the time it reaches the detector. As an example, smoke might be diluted by 75% by the time it reaches a detector. Under these circumstances, it would be desirable to subtract only 25% of the reference signal from the detector. Therefore, if the “nuisance” smoke causes an increase in signal at the reference of 10% full-scale output, setting the reference level to 25% will subtract 2.5% detector output from the detector. This means that any rise in smoke over and above this 2.5% level is probably due to a genuine fire condition in the protected area.

The value entered into the **Level** is the percentage of the reference’s output signal to be subtracted from the detector. The default value is 0.

4.3.23 Reference Desensitisation Delay (Detector, Numeric)

Menu: **Setup menu**
Submenu: **Reference**
Function(s): **Back-off (0-99)**

The reference Back-off figure reflects the fact that it may take time for smoke seen at the reference to reach the detector.

The value entered into the **Back-off** function is the time delay in minutes before smoke seen at the reference arrives at the detector. The default setting is 15 minutes.

To implement the referencing function, select the detector that will be used as a reference and carry out a smoke test. Using the **Detector read** function in the Diagnostics menu (see section 4.3.43), or in the Histogram screen of the remote control software (see the Remote Software Guide) note the maximum output level reached by the reference during the test. Select the address of the detector in the Histogram screen. Note the time interval before the detector output level begins to rise, and the maximum detector output level reached. Divide the increase in output level at the detector by the increase seen at the reference. Enter this fraction as a percentage into the **Level** function (i.e. for 25% enter 25), and enter the time delay into the **Back-off** function. Enter the address of the reference into the **Reference device** function (see section 4.3.20) and set the **Reference enable** function to **Yes** (see section 4.3.21). The reference system is now enabled. The unit will then begin a FastLearn, followed by a 24-hour learning period in order to optimise the system.

4.3.24 Front Panel Buttons (LCD, Yes / No)

Menu: **Setup menu**
Submenu: **Front panel**
Function(s): **ISOLATE enable Enter Yes/No**
 TEST enable Enter Yes/No
 RESET enable enter Yes/No

When **RESET enable** is set to **Yes**, pressing the front panel **<<RESET>>** button will reset all latching alarms (see section 4.3.12) and faults (see section 4.3.13) on all detectors on the communications loop. **RESET enable** is set to **No** by default. If, after pressing **<<RESET>>**, alarm or fault indications reappear, then the alarm or fault condition is ongoing. The function has the same effect as accessing the **Reset** function in the programmable functions list (see section 4.3.48).

When **ISOL enable** is set to **Yes**, pressing the **<<ISOL.>>** button on the front panel prevents the unit from sending fire or fault warnings to the connected fire panel. It may be used during detector maintenance or smoke testing. The LCD will show **Panel Isolate**. A fault signal is sent to a connected fire panel to indicate that it is Isolated, but will not send further fault indications until the unit is de-isolated.

To de-isolate a Standard Detector or Command Module, pressing the enabled **<<ISOL.>>** button again will disable the condition, showing **Panel de-isolate** on the LCD. **ISOL enable** is set to **No** by default.

The function has the same effect as accessing the **Isolate** function in the programmable functions list (see section 4.3.49).

When **TEST enable** is set to **Yes**, pressing the **<<TEST>>** button on a Command Module lights all LEDs on the front panel, including all the LEDs in the bargraph display and the alarm and fault LEDs.

On the Standard Detector, it will light all the LEDs and show a bargraph display decreasing by one LED at a time – this is also echoed on the Command Module, if connected. The detector will also show a legend such as 0.17% obs/m. This is the smoke density that needs to be present at the detector to initiate the Fire 1 alarm. However, this test does not cause alarms or faults to be signalled at the fire panel, and the LEDs are extinguished when the test concludes unless a genuine alarm or fault condition is present. The **<<TEST>>** button can be used during maintenance activities to check that the Command Module LEDs are working correctly. **TEST enable** is set to **Yes** by default.”

4.3.25 Power Saving Mode (Detector, Yes / No)

Set to No as this option is not available as a standard feature with the standard power supply.

Menu: **Setup menu**
Submenu: **Power checks**
Function(s): **Power save Enter Yes/No**

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 to minimum, regardless of the user-defined value. This function may be disabled if the minimum aspirator speed increases transport time unacceptably. (See Section 4.3.28, "Aspirator speed").



Note: *When in this condition, any smoke reading above 3 bar graph segments on the detector will automatically remove this condition.*

This function has no effect on the Command Module.

4.3.26 Power Supply Battery Fault Detection (Any, Yes / No)

Set to No as this option is not available as a standard feature with the standard power supply.

Menu: **Setup menu**
Submenu: **Power checks**
Function(s): **Power save Enter Yes/No**

This is a remote function (see section 4.2.4) requiring a remote input terminal to activate.

When set to Yes, Battery check is used to monitor the volt-free battery fault relay terminals of an Intelligent Power Supply (IPS). A fault is generated at the detector and the Command Module (if applicable) when the power supply indicates battery failure. Connect the power supply battery fault terminals to the selected remote input terminals.

When the function is enabled, and the power supply generates a battery error signal, the Fault LED will light on the detector and Command Module, and the message Battery fault will appear on the LCD display if applicable.



Note: *If latching faults are set (see section 4.3.13), then the unit will need to be reset to remove the fault indication (see sections 4.3.15, 4.3.24 and 4.3.48 as appropriate)*

By default, this function is set to Yes with "INPUT 1" as the activating terminal.

4.3.27 Power Supply Mains Fault Detection (Any, Yes / No)

Set to No as this option is not available as a standard feature with the standard power supply.

Menu: **Setup menu**
Submenu: **Power checks**
Function(s): **Power save Enter Yes/No**

If optioned this is a remote function (see section 4.2.4) requiring a remote input terminal to activate.

When set to **Yes**, **Mains check** is used to monitor the volt-free power fault relay terminals of an Intelligent Power Supply (IPS). A fault is generated at the detector and the Command Module (if applicable) when the power supply indicates mains failure. Connect the power supply power fault terminals to the selected remote input terminals.

When the function is enabled, and the power supply generates a power error signal, the Fault LED will light on the detector and Command Module, and **Mains fault** will appear on the LCD display, if applicable.

If latching faults are set (see section 4.3.13), then the unit will need to be reset to remove the fault indication (see sections 4.3.15, 4.3.24 and 4.3.48 as appropriate).

By default, this function is set to No.

4.3.28 Aspirator Speed (Detector, Numeric)

Menu: **Setup menu**
Submenu: **Air flow**
Function(s): **Aspirator speed (1-16)**

The value entered sets the aspirator in the detector to one of a range of predetermined speeds. The lower the number entered the lower the airflow rate and the lower the power consumption. The aspirator speed should be selected so that the smoke transport time from the farthest sampling hole from the detector is within any limits imposed by regulatory bodies (e.g., for the Loss Prevention Certification Board, this is 90 seconds). The longer the length of sampling pipes, the faster the aspirator speed should be set. Ampac's free *PipeCalculator* software can calculate estimated smoke transport times at different aspirator speeds for each sampling hole in a sampling pipe network. However, there is no substitute for carrying out smoke tests in order to ascertain the optimum aspirator speed setting.

The range of settings is from 1 (slowest) to 16 (fastest). The default fan speed for the detector is 8. If **Power save** is set to **Yes** (see section 4.25), then the fan speed will automatically reduce to 1 when the detector is running on battery power.



Note: *The fan speed is fixed at 1 for the FS25 and FS100.*

4.3.29 Airflow Fault Threshold (Detector, Yes / No)

Menu: **Setup menu**
Submenu: **Air flow**
Function(s): **Flow setup**

Setting this function to Yes puts the detector into automatic flow limit setup mode. This takes a few minutes to set the flow fault thresholds based on the current flow rates. The detector automatically sets up default high and low fault thresholds on initial power-up and when the Aspirator speed setting is changed (see section 4.3.28). The flow limits will also be automatically set up if a detector is powered down and powered up with the Auto FastLearn function enabled (see section 4.3.9). However, if sampling holes are added to or deleted from the sampling network, it is necessary to run the Flow setup function in order to assure that the optimum flow fault limits are set.

4.3.30 Enable / Disable Airflow Sensors (Detector, Yes / No)

Menu: **Setup menu**
Submenu: **Air flow**
Function(s): **Sensor pipe 1 to Sensor pipe 4**

The airflow sensor on the specified sampling pipe (1 to 4) is enabled when the function is set to **Yes**. If the function is set to **NO**, the detector will not generate any airflow faults for the specified pipe. The sampling pipes are in order 1-4 from left to right when the detector is viewed from the front.

In order to avoid flow faults, the flow sensors for unused sampling pipe ports should be disabled, and sampling port bungs must be fitted.

4.3.31 Airflow Rate (Detector, Yes / No)

Menu: **Setup menu**
Submenu: **Air flow**
Function(s): **Flow pipe 1 to Flow pipe 4**

This is the total airflow through a specified sampling pipe of a detector as a percentage of the flow sensor's full signal output. It is not an absolute measure of airflow in calibrated units. The function is for display purposes only and cannot be edited. When flow setup is performed on initial power-up with Auto FastLearn enable set to Yes (see function 4.3.9), or via the Flow setup command (see section 4.3.29), the flow sensor sets up the flow fault thresholds and the flow sensor ranges for all enabled sampling flow sensors (see section 4.3.30). Whatever the pipe configuration, the sensor will set itself up so that the "normal" flow reading is in the range 50-70%. Readings above 80 or below 40 may indicate pipe breakage or blockage problems. If, for example, the flow sensor stops responding, possibly due to a fault in the sensor, a standard Detector, and/or a Command Module connected to the detector would show the message Flow sensor fail on its LCD display.

4.3.32 Airflow Thresholds (Detector Numeric)

Menu: **Setup menu**

Submenu: **Air flow**

Function(s): **Flow low pipe 1 to Flow pipe flow 4 (0-99)**

Flow high pipe 1 to Flow pipe flow 4 (0-99)

Flow low is the flow sensor percentage reading below which the detector will generate a **Low flow** fault for the relevant sampling pipe. This may indicate a partial or total blockage in the sampling pipe.

Flow high is the flow sensor percentage reading above which the detector will generate a **High flow** fault. This may indicate a partial or total breakage of the sampling pipe.

The value of the high and low flow functions may be changed in the range 00-99% if required, although the detector's default flow fault thresholds are automatically set up on initial power-up or if the detector is powered down and then powered up with **Auto FastLearn** enabled (see section 4.3.9).

4.3.33 Detector Chart Log recording Rate (All, Numeric)

Menu: **Setup menu**
 Submenu: **Miscellaneous**
 Function(s): **Chart rate (0-19)**

Detectors store a continuous record of percentage detector output and either laser chamber output as a percentage of full scale or the flow sensor percentage airflow rate. This chart log can be viewed on a PC running Ampac's remote control software (see the Remote Software Guide) and saved to disk or sent by email for use as a diagnostic tool to show how the detector settings have varied over time. The detector stores readings at set intervals as determined by the **Chart rate** function. The faster the storage interval, the higher the resolution of the chart and the lower the time interval covered by a complete chart.

Changing the Chart rate value on a Command Module sets the chart recording rate for all detectors on the loop. It cannot be used to set individual values for each detector.

The detector is capable of storing a total of 2000 readings. At the lowest chart rate of 1 second per reading, the detector would store roughly the last 30 minutes' data in great detail. At the highest chart rate of 50 minutes per reading, the detector could retain approximately one month's data at a lower resolution. There are ten readings for each major division on the displayed bar graph. The default setting for the **Chart rate** function is 8 (1 reading every 20 minutes). It is necessary to specify whether the chart reading will store alarm level or flow rate along with the detector output percentage.

A table for the chart recording rates for each option is shown in the following table.

Setting	Data displayed	Storage interval	Time per division on chart log
0	Output + alarm level	1 second	10 seconds
1	Output + alarm level	5 seconds	50 seconds
2	Output + alarm level	12 seconds	2 minutes
3	Output + alarm level	30 seconds	5 minutes
4	Output + alarm level	1 minute	10 minutes
5	Output + alarm level	2 minutes	20 minutes
6	Output + alarm level	5 minutes	50 minutes
7	Output + alarm level	10 minutes	100 minutes
8	Output + alarm level	20 minutes	200 minutes
9	Output + alarm level	50 minutes	500 minutes
10	Output + airflow	1 second	10 seconds
11	Output + airflow	5 seconds	50 seconds
12	Output + airflow	12 seconds	2 minutes
13	Output + airflow	0 seconds	5 minutes
14	Output + airflow	1 minute	10 minutes
15	Output + airflow	2 minutes	20 minutes
16	Output + airflow	5 minutes	50 minutes
17	Output + airflow	10 minutes	100 minutes
18	Output + airflow	20 minutes	200 minutes
19	Output + airflow	50 minutes	500 minutes

4.3.34 User Defined Function Access Code (LCD< Numeric)

Menu: **Setup menu**
Submenu: **Miscellaneous**
Function(s): **Access code (0-9999)**

The access code is the four-digit number that has to be input before programmable functions can be edited (see section 4.1). The default access code is 0102, but for security purposes this can be changed to any four-digit number to prevent unauthorised access.

After the code is changed, the new access code will be required to gain access to the functions.

The individual access code for a detector cannot be set from a Command Module. In the case of Minimum Display Detectors, the code would need to be changed via a PC running the remote control software. (see Remote Software Guide).

In addition to this, if a detector's own access code has been changed, the access code when programming that detector from a Command Module will be the Command Module access code rather than the detector's own access code. Thus if a detector's code had been changed to 1234 via the remote control software whilst the Command Module was still at the default setting, the detector could still be programmed from the Command Module by entering 0102 when prompted for the access code.

4.3.35 Building Management System (BMS) Protocol (CM Numeric)

Menu: **Setup menu**
Submenu: **Miscellaneous**
Function(s): **BMS protocol (0-2)**

The default setting is 0 (TAP paging). This function sets the communications protocol for connection to a Building Management System (BMS). Refer to Section 7, "External Communications" for details of these protocols.

4.3.36 Detector Factory Default Settings (All, Yes / No)

Menu: **Setup menu**
Submenu: **Miscellaneous**
Function(s): **Factory default Enter Yes/No**

This function has two purposes. The value will change from **Yes** to **No** if any programmable function or functions are changed from the factory default settings. This happens automatically when a function is changed, and does not require user input.

Changing the function from **No** to **Yes** on a Command Module will reset all detectors on the RS485 communications loop to their factory default settings. To reset the functions for an individual detector, it is necessary to use the detector's own front panel (in the case of a Standard Detector), or a PC running Ampac's remote control software (see the Remote Software Guide).

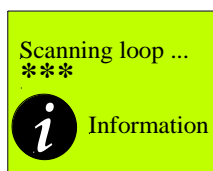
Changing the function from **Yes** to **No** has no effect, and the function will remain at **Yes**.

4.3.37 Command Module Scan for Detectors (CM, Yes / NO)

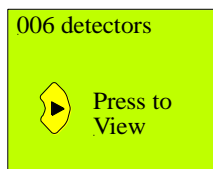
Menu: **Setup menu**
 Submenu: **Bus setup**
 Function(s): **Scan for devices Enter Yes/No**
 Number of detectors

This function needs to be set to **Yes** after installation of a detector loop in order for the Command Module to scan the RS485 data bus for installed detectors. This function should be carried out once detector installation and wiring to the Command Module are complete in order for the Command Module to recognise the detectors on the loop.

Setting the function to Yes starts the bus scan. The display shows following screen.

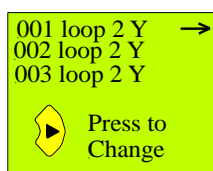


The progress bar under the “Scanning loop” legend moves to the right as the scan progresses. When the bus scan is complete, a screen appears as in the example below:




The number of detectors shown should correspond to the number of detectors installed. If the number is correct, this indicates that the installation is successful. The same screen can be reached without initiating a bus scan by selecting the next function in the **Bus setup** submenu, **Number of devices**. This is the recommended method for ascertaining numbers of detectors once the network is installed.

Pressing **<<right arrow>>** shows the list of detectors found by the scan in order of detector address number, as in the example below. An arrow cursor to the right of the screen indicates the currently selected detector.



Pressing **<<down arrow>>** successively shows the later entries in the list. **Y** next to a detector address indicates that the detector has been found by the bus scan, and **N** indicates that the Command Module cannot find a detector with that address setting. This may be because of a wiring problem, or because a detector has not been assigned that particular address.

Pressing **<<up arrow>>** steps up through the list. The list “wraps round” so that, for example, pressing **<<up arrow>>** when the arrow cursor is next to detector 1 brings up detector 127, and vice versa. **Loop 2** in the above example indicates that the Command Module is receiving data from the detectors on its RS485 Bus 2 terminals. Pressing **<<right arrow>>** allows the selected detector to be removed from the loop by using the **<<up arrow>>** or **<<down arrow>>** buttons on the Command Module to change the **Y** indication to **N**. This may need to be done if a detector requires replacement. Removing the detector will generate a fault indication at the Command Module, but it will allow the relevant detector address to be re-used for the replacement detector. Simply set the replacement detector’s address to be the same as that used by the removed detector, connect up the detector, navigate to the **Number of detectors** function and change the **N** indication next to the relevant address to a **Y**. If there are no fault indications, the detector has been successfully installed.

 **Note:** *The Bus scan function should only be used at installation or if making a permanent change to the detector network. If there are any errors in wiring leading to communications faults, these will be masked by a fresh bus scan, which will ignore any detector with which the Command Module is unable to communicate. This will eliminate any communications fault indications despite the fact that problems still exist.*

4.3.38 Fault – Tolerant Communication Bus (CM, Yes / No)

Menu: **Setup menu**
 Submenu: **Bus setup**
 Function(s): **Looped bus Enter Yes/No**

This function is set to **Yes** to signify that the detectors are connected to the Command Module in a fault tolerant loop configuration (see section 9.2.1 for details) The advantage of such a looped bus is that communications faults can be tracked down to individual detectors, and the disadvantage is that it requires additional communications wiring.

The default setting is **no**, but if the detectors are set up in a looped bus, the function must be set to **Yes** in order to gain the fault monitoring properties of the loop. Setting the function to **Yes** when a non-looped bus configuration is used will generate loop errors, so it is important to identify the type of configuration installed and to set the **Looped bus** function to the appropriate setting.

4.3.39 Command Module Communication Poll Time Out (CM, Numeric)

Menu: **Setup menu**
 Submenu: **Bus setup**
 Function(s): **Poll time out (30-255)**

The value of this function is the time, in milliseconds, that the Command Module will wait for a response from a detector after it is queried (polled) by the Command Module. If no response is received within the specified time, the Command Module Fault LED will light, and **Comms fault** will appear on the LCD display.

The default setting of 200 milliseconds will be adequate for most applications. However, if communications faults do appear, such as when units are communicating across a Wide Area Network (WAN), the value of the function may be increased to eliminate these.

4.3.40 Command Module Pager / GSM Phone Functions (CM, Various)

Menu: **Setup menu**
 Submenu: **Pager**
 Function(s): **Call centre**
 Password
 Pager
 Page on fault Enter Yes/No
 Page on alarm Enter Yes/No

The Command Module is capable of notifying personnel of alarms or faults by means of pagers or GSM mobile phones when connected to an RS232 modem.

Call centre: This is the telephone number that the Command Module will dial when fire alarms or faults occur. The number must be entered without spaces.

Password: This is an alphanumeric password that may be required to access the pager service.

Pager: This is the number of the target pager.

Page on fault: The pager recipient will be paged when a fault occurs.

Page on alarm: The pager recipient will be paged when an alarm occurs.

Section 6.1.3 gives further details on paging from a Command Module.

4.3.41 View Event Log (All, Entry)

Menu: **Setup menu**
Submenu: **N/A**
Function(s): **View event log**

Detectors and Command Modules store a continuous record of alarm and fault events, power-ups, function changes and various other changes of state and aspects of the units with their time and date.

Selecting the **View event log** function displays a list of the last 200 events in reverse chronological order (the most recent events are at the top of the list). Use the **<<down arrow>>** and **<<up arrow>>** to scroll through the events in order.

This event log can also be viewed on a PC running Ampac's remote control software (see the Remote Software Guide) and saved to disk or sent by email for use as a diagnostic tool, or accessed without entering the programmable functions by pressing the **<<down arrow>>** button on a Command Module or Standard Detector when in the "Normal Operation" screen.

When viewing the event log for a Command Module, this will show all events generated by all detectors on the loop. To view an individual detector's event log, it is necessary to access this via the front panel (for Standard Detectors) or via the remote control software (see the Remote Software Guide).

4.3.42 Detector Diagnostic Tests (Detector , Entry)

Menu: **Diagnostics menu**
Submenu: **N/A**
Function(s): **Diagnostics**

Accessing the **Diagnostics** function begins a series of tests which cover all the major systems of the detector. To test an individual detector from a Command Module, enter its address when prompted. To test all detectors on the loop, enter address "000" (the Command Module address). The tests are as follows:

A/D... This test checks the Analogue to Digital circuitry

Relays... This checks the alarm and fault relay drive circuitry

Aspirator... This test may last for several minutes, during which time the detector's aspirating fan will stop for thirty seconds or so and then go to maximum speed before returning to normal. This is perfectly normal, and no flow faults will be generated on the detector or Command Module during the test.

Laser assy... This checks that the detector's optical smoke detection chamber is working properly.

For each test, the display will indicate **PASS** or **FAIL** on completion of the test.

The **Diagnostics** function may be carried out as part of commissioning or maintenance and checking.

4.3.43 Detector Output / Flow Readings (Detector, Entry)

Menu: **Diagnostics menu**
Submenu: **N/A**
Function(s): **Detector read**

Accessing this function and entering allows a detector's sensor head output and current airflow reading to be viewed in real time. A screen appears showing five percent-age figures.

The left-hand figure shows the detector output as a percentage of full-scale reading. Detector output is independent of the ClassiFire alarm factor and can be used to assess the speed of response of the unit to smoke tests. It is also of use to assess the relative effects of external sources of smoke on reference detectors and detectors using that reference, in order to select the correct value for the reference **Level** function (see section 4.3.21).

The right-hand figure 5 represents the airflow through each of the detector's sampling pipes as a percentage of full scale. It is the same as the reading in the **Flow pipe** function (see section 4.4.30), except that it updates in real time.

4.3.44 Communication Loop Errors (LCD, Entry)

Menu: **Diagnostics menu**
 Submenu: **Loop errors**
 Function(s): **N/A**

This function displays the percentage error rate that the Command Module has detected on its communications loop.

A loop error rate of 00.0% indicates that there are no communications problems. Frequent loop errors, i.e. error rates significantly above 0% may indicate a problem with communications wiring, or excessive EMC radiation interrupting RS485 communications. The loop error rate for Minimum Display Detectors can only be seen in the “Bus Viewer” of the remote control software (see the Remote Software Guide).

4.3.45 Dust Separator Filter Condition (Detector, Entry)

Menu: **Diagnostics menu**
 Submenu: **Dust separator**
 Function(s): **N/A**

This function displays the condition of the detector’s dust separator filter in percentage terms. A new or clean filter will show the figure 99%. As the filter begins to fill with dust, the figure will decrease. When the filter reading reaches 80%, the detector will generate a **Separator change** fault. (See section 11, “Maintenance”).

4.3.46 Fire and Fault Relay Tests (Any, Entry)

Menu: **Diagnostics menu**
 Submenu: **Relay test**
 Function(s): **AUX**
 PreAlarm + Fault
 Fire 1 + Fault
 Fire 2 + Fault
 Fault

These tests exercise the relevant detector’s alarm and fault relays and communications wiring. On entering the **Relay test** submenu, **Aux** will appear on the detector’s display, and a Standard Detector will generate an **Aux** alarm, lighting the **Aux** LED and closing the detector’s **Aux** relay. This will be echoed on a connected Command Module.

The FIRE LED on a Minimum Display Detector is linked to the **Fire 1** alarm, and so will not light at this stage, although the **Aux** relay will close.

On pressing <<ENTER>>, the **PreAlarm + Fault** test will commence, generating a **PreAlarm** warning. The **Fault** LED and relay on the detector and/or the Command Module will also be activated.

Pressing <<ENTER>> then starts the **Fire 1 + Fault** test, and so on.

Pressing <<ENTER>> after the Fault relay test, or pressing <<RESET>> at any time during the test sequence exits the test module and deactivates the alarm and fault relays on the detector, regardless of whether latching alarms or faults are enabled. The test sequence will be aborted automatically if no key press is detected within three minutes.



IMPORTANT NOTE *The purpose of the relay tests is to verify correct wiring and communications to the Command Module and to the fire panel. The tests bypass detector and Command Module isolation, and will therefore always initiate an alarm or fault signal at the fire panel regardless of whether the detector or Command Module is isolated. It must therefore be ensured that all evacuation alarms, fire brigade call-out systems, sprinkler systems, gas dispensing systems etc. are disabled at the fire panel during the test, or otherwise prevented from activation. Ampac can take no responsibility for any expense or damage occasioned as a result of failing to take such precautions prior to carrying out a test.*

4.3.47 Watchdog Interrupt Count (LCD, Entry)

Menu: **Diagnostics menu**

Submenu: **N/A**
 Function(s): **Watchdog count**

The watchdog is a circuit built into detectors and Command Modules that resets the processor in the event of a failure to function properly. When this occurs, the detector will generate a fault indication and a **Watchdog reset** fault will be generated. The total watchdog reset count for a Standard Detector must be accessed through its own front panel, and the count for a Minimum Display Detector is only available through the "Device information" tab in the "Function settings" screen of the remote control software (see Remote Software Guide).

When applied to a Command Module, the **Watchdog count** function displays only the total number of watchdog resets for the Command Module, although individual watchdog resets from all detectors on the loop will be visible in the Command Module event log.

4.3.48 Detector Command Module Reset (All, Entry)

Menu: **N/A**
 Submenu: **N/A**
 Function(s): **Reset**

When this function is accessed and the Command Module or Standard Detector <<ENTER>> button is pressed, it has the same effect as pressing the enabled <<RESET>> button on the front panel.

For a Standard Detector, It will cause any latching alarms (see section 4.3.12) and latching faults (see section 4.3.13) to be cancelled from the fire and fault relays and LED's, regardless of whether **RESET enable** (see section 4.3.24) is set to **Yes** or **No**.

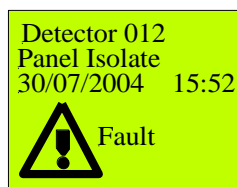
Using the function on a Command Module will reset all detectors on the loop.

The function will also remove fault or fire indications from the Command Module and Standard Detector LCD displays to show the "Normal Operation" screen. If, after pressing <<RESET>>, alarm or fault indications reappear, then the alarm or fault condition is ongoing.

4.3.49 Detector / Command Module Isolate From Fire Panel (All, Entry)

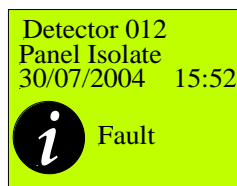
Menu: **N/A**
 Submenu: **N/A**
 Function(s): **Isolate**

When this function is accessed, it will prevent the unit from sending fire or fault warnings to the connected fire panel and may be used during commissioning smoke tests or detector maintenance. The detector and Command Module Fault LEDs will light and a fault indication will be sent to the fire panel. A screen similar to the following example appears on the Command Module LCD:



The detector will not send any further fault or fire indications to the fire panel until the unit is de-isolated. This enables smoke tests to be carried out without disconnecting the detector from the communications loop. To de-isolate a detector, re-select the **Isolate** function.

A screen similar to the following example appears on the Command Module LCD:



The detector and Command Module Fault LEDs will only be extinguished if Latching faults are disabled (see section 4.3.13). If latching faults are enabled, pressing the enabled <<RESET>> button (see section 4.3.25) or selecting the Module Reset function (see section 4.3.45) will clear the fault indications.



IMPORTANT NOTE The Isolate function is overridden by the diagnostic relays tests (see section 4.3.44), which will send fire and fault signals even if the detector or Command Module is isolated. If such tests are used during maintenance, commissioning or other testing, care must be taken that sprinkler systems, gas drop equipment, fire brigade call-outs etc are disabled at the fire panel.

4.3.50 Exiting Programming Mode (LCD, Entry)

Menu: **N/A**
Submenu: **N/A**
Function(s): **Exit**

Accessing this function and pressing <<ENTER>> exits the programmable functions list completely. The same function is achieved by pressing the <<RESET>> on the Standard Detector or Command Module. The <<RESET>> button does not need to be enabled to be able to exit the programmable functions.

4.3.51 Menu Map

The following tables show all programmable functions for Detectors and Command Modules. Note that all detector functions and submenus are visible in the Command Module menus, but “Detectors only” functions will only appear if a valid detector address is entered. Entering “000” as the address in these functions will cause Bad detector to appear on the Command Module display. For the Minimum Display detector, these functions are only available through a Command Module or via the remote control software.

Top level (Detectors and Command Modules)

Setup menu
Log menu
Diagnostic menu
Reset
Isolate
Exit

Setup menu submenu

Detector

Time and date
Alarm levels
Alarm actions
Detector
Reference
Front panel
Air flow
Miscellaneous

Command Module

Time and date
Alarm levels
Alarm actions
Detector
Reference
Front panel
Air flow
Miscellaneous
Bus setup
Pager

The individual functions are given below for each submenu as they appear on the LCD display, their ranges of values, default settings and comments are given below:

Time and date submenu (Detectors and Command Modules)

Function	Range of values	Default value	Section	Comments
Time	00: 00 – 23:59	00:00	4.4.1	Set t o UK to me on dispatch
Date	01/01/00 – 31/12/99	01/01/00	4.4.1	DD/MM/YY format

Alarm levels submenu (Detectors only)

Function	Range of values	Default value	Section	Comments
Fire 2 level	1 – 25% obs/m	20	4.4.2	Absolute alarm level
Fire 1 level	8-10	8	4.4.2	Relatively scaled alarm level
PreAlarm level	3-8	6	4.4.2	Relatively scaled alarm level
Aux level	2-10	10	4.4.2	Relatively scaled alarm level
Fire 2 delay	0 - 99 seconds	5	4.4.3	
Fire 1 delay	0 - 99 seconds	5	4.4.3	
PreAlarm delay	0 - 99 seconds	5	4.4.3	
Aux delay	0 - 99 seconds	5	4.4.3	
Class. override	0 - 99% output	0	4.4.4	000 – 099 Main Board input 100 – 199 relay / input card input / APIC
Alarm factor	0 – 8	4	4.4.5	Changing value starts FastLearn
Day start	00 – 23 hours	8 (08:00)	4.4.6	
Night start	00 – 23 hours	19 (19:00)	4.4.6	
LDD(TM) enable	Yes / No	Yes	4.4.7	
FastLearn start	Yes / No	Yes	4.4.8	Changes to No on FastLearn end
Auto FastLearn	Yes / No	Yes	4.4.9	

Alarm actions submenu (Detectors)

Function	Range of values	Default value	Section	Comments
Delay override	Yes / No	No	4.4.10	
Cascading alarms				
Yes / No	Yes	4.4.11		
Latching alarms	Yes / No	No	4.4.12	
Latching faults	Yes / No	Yes	4.4.13	
Remote day/night	Yes / No, remote inputs 1-6	No	4.4.14	Remote inputs 1-3 on main board, inputs 4- 6 are relay / input cards "I/P 1" to "I/P 3"
Remote reset	Yes / No, remote inputs 1-6	No	4.4.15	Remote inputs 1-3 on main board, inputs 4- 6 are relay / input cards "I/P 1" to "I/P 3"
Remote Isolate	Yes / No, remote inputs 1-6	No	4.4.16	Remote inputs 1-3 on main board, inputs 4- 6 are relay / input cards "I/P 1" to "I/P 3"
Prog. Isolate	Yes / No	No	4.4.17	

Alarm actions submenu (Command Modules)

Function	Range of values	Default value	Section	Comments
Latching alarms	Yes / No	No	4.4.12	
Latching faults	Yes / No	Yes	4.4.13	
Remote reset	Yes / No, remote inputs 1-6	No	4.4.15	Remote inputs 1-3 on main board, inputs 4- 6 are relay / input cards "I/P 1" to "I/P 3"
Remote Isolate	Yes / No, remote inputs 1-6	No	4.4.16	Remote inputs 1-3 on main board, inputs 4- 6 are relay / input cards "I/P 1" to "I/P 3"
Prog. Isolate	Yes / No	No	4.4.17	

Detector submenu (Detectors)

Function	Range of values	Default value	Section	Comments
Detector address	001 - 127	N/A	4.4.18	As set on detector DIP switch
Device text	16 char. Alphanumeric	Ampac	4.4.19	

Detector submenu (Command Modules)

Function	Range of values	Default value	Section	Comments
<<XYZ>> detectors	001 - 127	N/A	4.4.20	As detected by bus scan
Device text	16 char. Alphanumeric	Command Module	4.4.21	

Reference submenu (detectors only)

Function	Range of values	Default value	Section
Reference enable	Yes / No	No	4.4.20
Reference device	001 - 127	001	4.4.21
Level	0-99% output	0	4.4.22
Back-off	0-99 seconds	15	4.4.23

Front panel submenu (Detectors and Command Modules)

Function	Range of values	Default value	Section	Comments
ISOLATE enable	Yes / No	No	4.4.24	No effect on Min. Display Detector
TEST enable	Yes / No	Yes	4.4.24	No effect on Min. Display Detector
RESET enable	Yes / No	No	4.4.24	No effect on Min. Display Detector

Power checks submenu (Detectors)

Function	Range of values	Default value	Section	Comments
Power save	Yes / No	Yes	4.4.25	
Battery check	Yes / No	Yes	4.4.26	INPUT 1 terminal by default
Mains check	Yes / No	No	4.4.27	

Power checks submenu (Command Modules)

Function	Range of values	Default value	Section	Comments
Battery check	Yes / No	Yes	4.4.26	INPUT 1 terminal by default
Mains check	Yes / No	No	4.4.27	

Air flow submenu (Detectors only)

Function	Range of values	Default value	Section	Comments
Aspirator speed	1 (min) – 16 (max)	8	4.4.28	Changed value starts flow limit setup
Flow setup	Yes / No	Yes	4.4.29	Changes to No when finished
Sensor 1 enable	Yes / No	Yes	4.4.30	Disable if pipe not used
Flow pipe 1	00 – 99%	Auto	4.4.30	Display value only
Flow low pipe 1	00 – 99%	Auto	4.4.30	Auto set during flow limit setup
Flow high pipe 1	00 – 99%	Auto	4.4.30	Auto set during flow limit setup
Sensor 2 enable	Yes / No	Yes	4.4.30	Disable if pipe not used
Flow pipe 2	00 – 99%	Auto	4.4.30	Display value only
Flow low pipe 2	00 – 99%	Auto	4.4.30	Auto set during flow limit setup
Flow high pipe 2	00 – 99%	Auto	4.4.30	Auto set during flow limit setup
Sensor 3 enable	Yes / No	Yes	4.4.30	Disable if pipe not used
Flow pipe 3	00 – 99%	Auto	4.4.30	Display value only
Flow low pipe 3	00 – 99%	Auto	4.4.30	Auto set during flow limit setup
Flow high pipe 3	00 – 99%	Auto	4.4.30	Auto set during flow limit setup
Sensor 4 enable	Yes / No	Yes	4.4.30	Disable if pipe not used
Flow pipe 4	00 – 99%	Auto	4.4.30	Display value only
Flow low pipe 4	00 – 99%	Auto	4.4.30	Auto set during flow limit setup
Flow high pipe 4	00 – 99%	Auto	4.4.30	Auto set during flow limit setup

Miscellaneous submenu (Detectors)

Function	Range of values	Default value	Section	Comments
Chart rate	00 - 19	8	4.4.31	0 – 9 alarm level, 10 - 19 flow rate
Access code	0000 - 9999	0102	4.4.32	
Factory default	Yes / No	Yes	4.4.34	Any changed function sets to No

Miscellaneous submenu (Command Module)

Function	Range of values	Default value	Section	Comments
Access code	0000 - 9999	0102	4.4.32	
BMS protocol	0 - 2	0	4.1.33	TAP paging by default
Factory default	Yes / No	Yes	4.4.34	Any changed function sets to No

Bus setup submenu (Command Modules only)

Function	Range of values	Default value	Section	Comments
Scan for devices	Yes / No	Yes	4.4.35	Changes to No when finished
Number of detectors	0 - 127	0	4.4.35	As detected by bus scan
Looped bus	Yes / No	No	4.4.36	
Poll time out	30 – 255 ms	200	4.4.37	

Pager submenu (Command Modules only)

Function	Range of values	Default value	Section
Call centre	16 chars numeric	All zeros	4.4.38
Password	16 chars alphanumeric	All zeros	4.4.39
Pager	16 chars numeric	All zeros	4.4.40
Page on fault	Yes / No	No	4.4.41
Page on alarm	Yes / No	No	4.4.42

Event log submenu (Detectors and Command Modules)

Function	Section	Comment
View event log	4.4.43	Press <<ENTER>> to view log

Miscellaneous submenu (detectors)

Function	Range of values	Default value	Section	Comments
Diagnostics	Yes / No	No	4.4.44	Automatic series of tests with PASS / FAIL indication
Detector read	Yes / No	No	4.4.45	% output and flow readings
Loop errors	Yes / No	Yes	4.4.46	Disable if pipe not used
Dust separator	000 – 100%	100	4.4.47	Separator fault if below 80%
Relay test	Aux	N/A	4.4.48	Press <<ENTER>> for next test
Pre-Alarm + fault	N/A	4.4.48	Press <<ENTER>> for next test	
Fire 1 + fault	N/A	4.4.48	Press <<ENTER>> for next test	
Fire 2 + fault	N/A	4.4.48	Press <<ENTER>> for next test	
Fault	N/A	4.4.48	Press <<ENTER>> to exit	
Watchdog count	00 - 99	00	4.4.49	

Functions in root menu (Detectors and Command Modules)

Function	Section	Comments
Reset		Press <<ENTER>> to reset
Isolate		Press <<ENTER>> to reset
Exit		Press <<ENTER>> to exit programming mode

4.3.52 Error messages

Access timeout	No front panel button has been pressed for 15 minutes
Bad access code	1. An incorrect access code has been entered (see section 3.1), 2. 5 minutes has passed since the user was prompted for an access code and no code has been entered.
Bad date	The date format on the detector is DD/MM/YY. A date outside the limit of 31/12/99 has been entered.
Bad detector	1. A function has been assigned to a detector whose address does not appear in the Command Module's list of detectors 2. A detector address greater than 127 has been entered 3. A detector address of 000 has been entered for a function which does not apply to Command Modules.
Bad time	The date format on the detector is HH/MM. A time outside the limit of 23:59 has been entered.
Bad value	A value has been entered for a function which is outside that function's allowed range of values.
Battery fault (NOT FITTED AS STANDARD OPTION)	1. A battery fault indication has been received from an intelligent power supply connected to the detector or Command Module's remote input terminals 2. The Battery check function is enabled and the assigned remote input has not been connected to the battery fault outputs of an intelligent power supply
Comms fault	The Command Module has interrogated a detector, and no response has been received by the time that the specified Poll timeout has elapsed (see section 4.4.37)
Detector fault	There is a problem with the detector laser chamber. Detector output has fallen to 0%
Flow sensor fail	There may be a problem with the detector's flow sensor board.
High flow	The airflow sensor has registered a flow value above the detector's Flow high level. This may indicate a broken or detached sampling pipe.
Key stuck	A front panel button is stuck "on"
Loop break	1. 006 < X > 007 Loop break
	In a looped bus configuration (see section 8.2.2), the Command Module has detected a break in the communications bus between the detector addresses 6 and 7. This could be due to incorrect or damaged wiring between the detectors.
	2. 000 X 010 Loop break
	In this example, the Command Module has been unable to localise the loop break. This implies that detector 10 is the last detector in a non-fault tolerant network (see section 8.2.2), but the Looped bus function has incorrectly been set to Yes (see section 4.4.36), or that the return wiring from detector 10 to the Command Module is incorrect or damaged.
Low flow	The airflow sensor has registered a flow value below the detector's Flow low level. This may indicate a blockage in the sampling pipe.
No response	The Command Module has polled a detector and has not received a response before the specified Poll timeout delay has elapsed. This may occur if the Command Module is trying to read a function that does not apply to the target detector.
Mains fault (NOT FITTED AS STANDARD OPTION)	1. A power fault indication has been received from an intelligent power supply connected to the detector or Command Module's remote input terminals

	2. The Mains check function is enabled and the assigned remote input has not been connected to the mains fault outputs of an intelligent power supply
RTC fail	The detector or Command Module's Real Time Clock (RTC) has failed. This may be due to an exhausted RTC battery.
Separator	1. The dust separator has been removed from the detector
Change	2. The dust separator has been replaced in the incorrect orientation (see section 10)
Separator renew	The dust separator reading has fallen below 80%. The separator needs replacing (see section 10)
Watchdog reset	The detector processor has been restarted. This could be because of a momentary interruption of power, mains spikes or excessive EM impulses.

4.3.53 Menu map summary

	Menu	Submenu	Item	Section	
MAIN MENU	Setup Menu	Time and Date	Time HH:MM Date DD/MM/YYYY	4.3.1	
		Alarm levels	Fire 2 level (1-25) Fire 1 level (8-10) Pre Alarm level (3-8) Aux level (2-10)	4.3.2	
			Fire 2 delay (0-99) Fire 1 delay (0-60) Pre Alarm delay (0-60) Aux delay (0-60)	4.3.3	
			Class. override (0-99)	4.3.4	
			Alarm factor (0-5)	4.3.5	
			Day start (0-23)	4.3.6	
			Night start (0-23)		
			LDD(TM) enable Enter Yes/No	4.3.7	
			FastLearn start Enter Yes/No	4.3.8	
			Auto FastLearn Enter Yes/No	4.3.9	
			Alarm actions	Delay override Enter Yes/No Cascading alarms Enter Yes/No Latching alarms Enter Yes/No Latching faults Enter Yes/No Remote day/night Enter Yes/No Remote reset Enter Yes/No Remote isolate Enter Yes/No Prog. Isolate on Enter Yes/No	4.3.10 4.3.11 4.3.12 4.3.13 4.3.14 4.3.15 4.3.16 4.3.17
			Detector	Detector address Device text	4.3.18 4.3.19
			Reference	Reference enable Enter Yes/No Reference device (1-127) Level (0-99) Back off (0-99)	4.3.20 4.3.21 4.3.22 4.3.23
			Front panel	ISOLATE enable Enter Yes/No TEST enable Enter Yes/No RESET enable Enter Yes/No	4.3.24
			Power checks	Power save Enter Yes/No Battery check Enter Yes/No Mains check Enter Yes/No	4.3.25 4.3.26 4.3.27
			Air flow	Aspirator speed (1-16)	4.3.28
			This sequence is → repeated for each pipe 1-4 so that 'Flow high pipe 1' is followed by 'Sensor 2 enable' etc	Flow setup Enter Yes/No	4.3.29
				Sensor 'N' enable Enter Yes/No	4.3.30
				Flow pipe 'N' Flow low pipe 'N' (0-99) Flow high pipe 'N' (0-99)	
			Miscellaneous	Chart rate (0-5) Access code (0-9999) BMS protocol (0-2) (CM only) Factory default Enter Y/N	4.3.33 4.3.34 4.3.35 4.3.36
			Bus setup (CM only)	Scan for devices Enter Yes/No Numbers of detectors Looped bus Enter Yes/No Poll time out (30-255)	4.3.37 4.3.38 4.3.39
			Pager (CM only)	Call centre Password Pager Page on fault Enter Yes/No Page on alarm Enter Yes/No	4.3.40

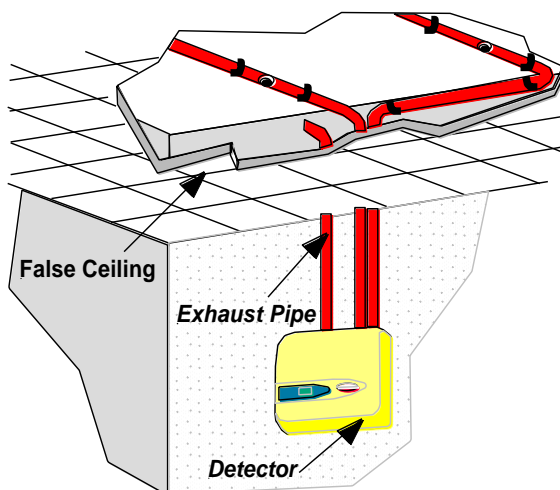
	Log menu	View event log		4.3.41
		Diagnostics		4.3.42
		Detector read		4.3.43
		Loop errors		4.3.44
		Dust separators		4.3.45
	Diagnostic menu	Relay test	Aux Pre Alarm + Fault Fire 1+Fault Fire 2+Fault Fault	4.3.46
		Watchdog count		4.3.47
	Reset			4.3.48
	Isolate			4.3.49
	Exit			4.3.50
Menu Map			4.3.51	

5 Sampling Pipe Design

5.1 Pipework

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 **FastSense PLUS**. The information contained in this Handbook is intended as an overview only. For further information please see the complete System Design Guide.

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 airflow along the sampling pipes. If it is not possible to locate the detector within the protected area it may be necessary to lead an exhaust pipe from the detector exhaust port returning air to the protected area.



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 airflow (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. To assist in design and to verify system performance, it is advisable to use the PipeCalculator sampling pipe modelling software.

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

- a. The ideal internal diameter of sampling pipes is 21mm. Other sizes will often work but will provide different 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 airflow) 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.

6 Installation

6.1 General

d. Sampling pipes must have capped ends. The end cap should be drilled with a sampling hole normally between 4 or 5mm diameter and free from burrs. Sampling holes should normally be 3-4mm diameter or as calculated by *PipeCalculator* and free from burrs. Each pipe run should not have more than 25 holes. Pipe transit time must not exceed 120 seconds for LPCB or 90 seconds for AS1603 PT8, AS1670-PT1 and an approved type of pipe must be used for installations conforming to LPCB or AS1603 PT8, AS1670-PT1 requirements. When drilling holes in the sample pipes, or cutting off lengths of pipe, ensure that all swarf and debris is removed from the pipe.

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, *PipeCalculator* be used to ensure that transit times, balance of suction and individual sampling point sensitivity are within desired limits.

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.

Unused sampling pipe inlets must be closed. For advice on pipe layout design consult the 'System Manual' and contact Ampac in case of difficulty.

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).

Ensure that when the detector is fitted to the wall there is enough space on the right hand side to allow removal and replacement of the filter element. (see section 10, Maintenance).

It is strongly recommended that the alarm relays of a single Detector or Command Module are not used directly to release extinguishing media, e.g. water mist or gas drop equipment.

6.2 Mechanical installation

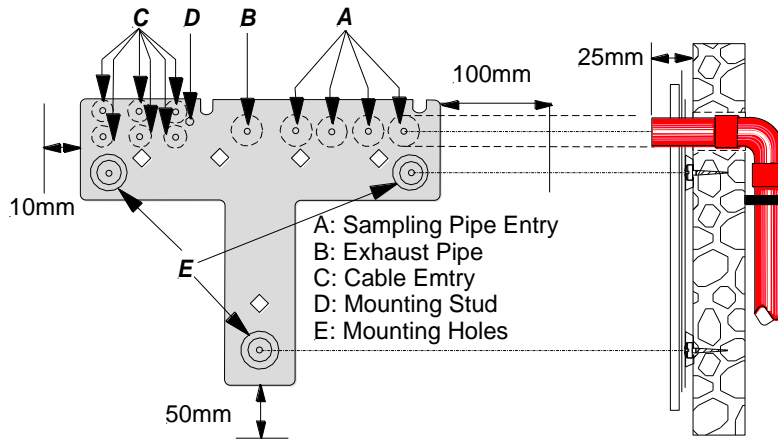
The detector body is fitted to a wall-mounting bracket which is attached to the wall via the mounting holes **E** as shown below. The detector is then fitted over the mounting stud **D** and secured inside the detector body with the nut provided for the purpose.

For a more discreet layout, it is possible to allow the sampling pipes and cables to enter the detector from the rear (see illustrations below), with the sample pipes and connection cables channelled into the wall. In order to achieve this, sampling holes **A** and **B** need to be opened up to a diameter of 30mm to take the sampling pipes (A) and the exhaust pipe (B). The holes **C** need to be opened up to 25mm diameter in order to take a suitable threaded metal cable gland to provide adequate RF screening for the connection cables. These modifications are shown in dotted lines below.

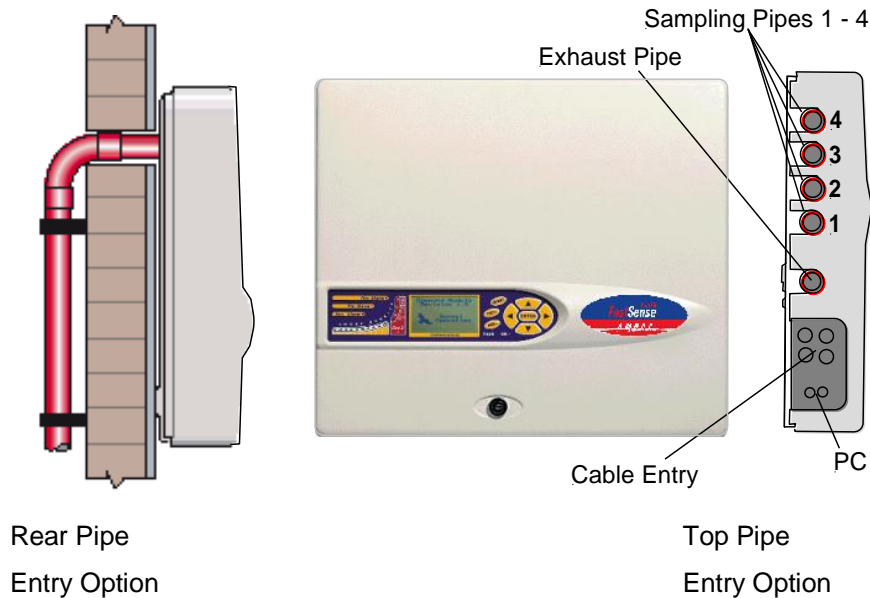
Clearance must be left around the mounting bracket so that the detector cover can be removed and replaced, so that the dust separator filter can be removed and replaced (see section 10), and so that a serial cable can be attached to the RS232 serial port is required (see illustration in section 8.5).

It is recommended that 100mm of clearance is left above and to the right of the mounting brackets, 50mm below and 10mm to the left.

The wall will also need to be suitably prepared to allow the mounting plate to sit flush against the wall. The sampling and exhaust pipes must also extend out of the wall sufficiently to tightly engage in the pipe entries on the rear of the detector as shown. A good starting point would be 25mm of pipe extending past the back plate. If the detector then sits proud of the bracket, the pipe excess can be trimmed back in small increments until the correct fit is achieved.



Mounting Bracket and Sampling Pipe Rear Entry Installation



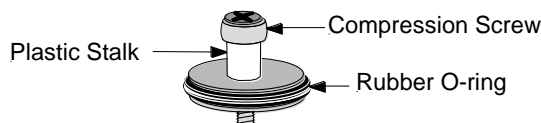
6.2.1 Sampling Pipes

Pipes should be prepared as indicated in section 4.1. **FastSense PLUS** detectors have five pipe inlets. As viewed from the front of the detector, these run (from left to right) Exhaust – Sampling pipe 1 - Sampling pipe 2 - Sampling pipe 3 - Sampling pipe 4.

Each sampling pipe inlet on the detector is supplied with a sampling port bung fitted to avoid ingress of dust and detritus inside the detector. These should be left in place if the sampling pipe will not be used, but will need to be removed before a pipe is installed into the detector. To remove the bung, look into the relevant sampling pipe inlet and you will see a Philips (cross-head) screw. Loosen this by about half a turn.


 **Note:** Do not remove the screw completely

Lift out the sampling port bung by the plastic stalk on the bung. The bung is held in place by means of the fastening screw compressing a rubber “O-ring” so that it grips the inside of the sampling port entry. When the compression is released, the bung can be lifted out.



If using the rear pipe inlets, be sure to fit two of the removed sampling port bungs in the exhaust pipe and sampling port 1 on the top face of the detector.

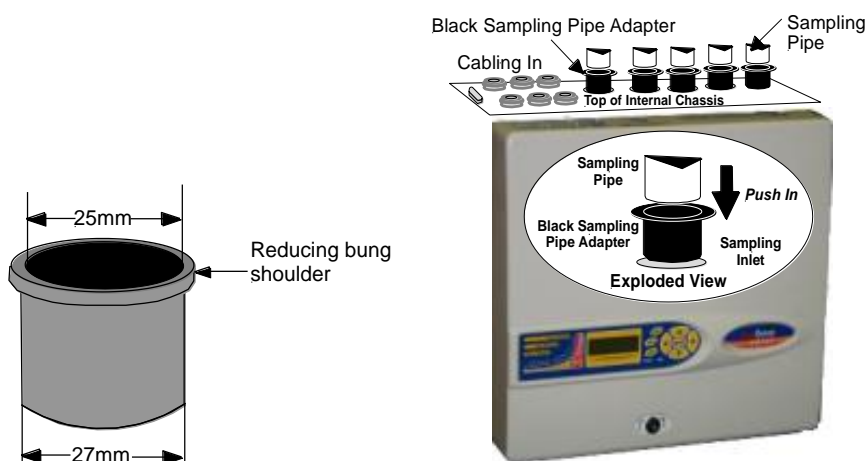
Detectors will accept pipe of 27mm outside diameter (o.d.), but adaptors to allow the use of 25mm o.d. can be supplied separately or fitted to units prior to dispatch, if requested. Use only sufficient force to ensure that the pipe is snugly engaged in the inlet, as excessive force may cause damage to the detector.


 **Note:** If the pipe will not stay in the sampling pipe inlet this may either be that the sampling pipe bung is still fitted (see above) or because the pipe is too narrow.

6.2.2 Pipe Reducing Bungs

The detector sampling pipe inlets accept pipe work of 27mm outer diameter. Pipe reducing bungs are required for the detector to accept pipes of 25mm outer diameter. To use a 25mm pipe, simply remove the sampling port bung (see section 5.2.1), push the sleeve into the pipe inlet with the “shoulder” on the sleeve uppermost, and push the pipe into the sleeve.

 **Note:** For ease of identification the pipe adapter for the FastSense Plus is black in colour.



 **Note:** Do not use excessive force when fitting the pipe, as this may cause damage to the sleeve or the detector.

6.2.3 Removal and replacement of the detector front cover



To remove the front cover, unlock it using the key provided (turn anticlockwise). The bottom of the front cover may then be lifted away from the detector chassis until the top of the cover disengages from the retaining rails at the top of the chassis. The cover may then be removed.

If greater internal access is required, e.g. for software upgrades, it may be necessary to remove the LCD display board. To do this, unfasten the four counter-sunk crosshead screws holding the display to the display mounting brackets.



Note: *It is not necessary to remove the remaining four screws - see sections 1.3, 1.4, 1.5.*

Lift the display away from the main board. If the display needs to be completely removed, unplug the display ribbon connectors from the detector or Command Module main board, taking note of the position of the connectors which are as follows:

For the Standard Detector, a single ribbon cable connected to the detector's 'Front Panel' display connector (see section 1.3)

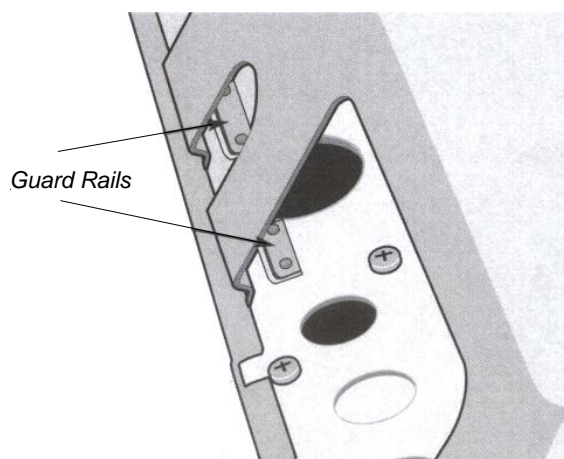
For the Command Module detector, a twin ribbon cable, one ribbon connected to the detector's 'Front Panel' display connector and marked 'DISPLAY DET', and one connected to the Command Module board's 'Commander Display' connector and marked 'DISPLAY COM' (see sections 1.3 and 1.4).

For the stand-alone Command Module, a twin ribbon cable, one ribbon connected to the 'Detector Display' connector and marked 'COMMAND DET', and one connected to the 'Commander Display' connector and marked 'COMMAND COM' (see section 1.5).

When completely removing the display it is recommended that the ribbon connectors be removed from the main detector or Command Module board rather than from the display board. When removing these connectors, ensure that suitable antistatic pre-cautions are taken, e.g. use of antistatic wrist straps, to prevent possible static damage to the unit's electronics. Refitting of the display is the reverse of the above procedure.

NB: ensure that the connectors are refitted as described above.

To refit the front cover, hook the recessed lip at the top of the front cover behind the two retaining guard rails at the top of the chassis like so:



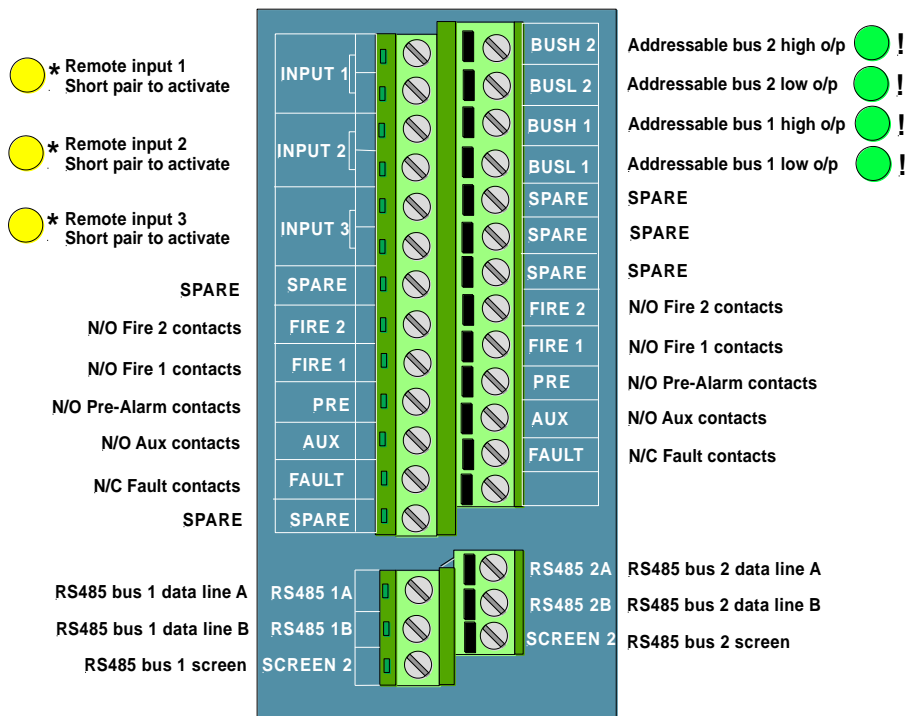
6.3 Electrical installation

6.3.1 Detector terminal block connections

All electrical (power and signal) connections should be made to the green terminal block inside the detector. Power cables should be screened and of sufficient current carrying capacity. Signal cable should be 120Ω screened twisted pair such as Belden 9841 0.22mm². Power and signal cables should enter the detector via metal cable glands.

The terminals may also be used for ClassiFire override (see section 4.3.4), remote day/night switching (section 4.3.14), remote reset (section 4.3.15), remote isolate (section 4.3.15). For these functions, short the relevant terminals together.

Terminal block connections are as described below.



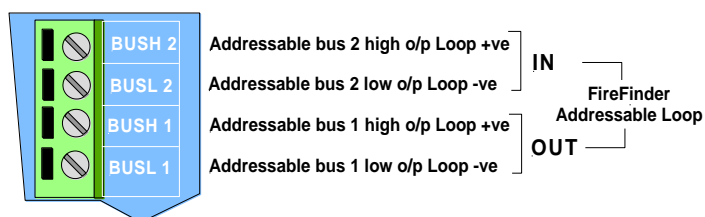
N/O = Normally open contacts - rated at 500Ma @ 30VDC

N/C = Normally closed contacts - rated at 500Ma @ 30VDC

* These connections can be used as the input terminals for mains supply and battery fault sensing. When this is the case, the contacts will signal a fault when the contacts are open rather than closed, as fault relays operate in the opposite sense to other relays, i.e. they are open for normal operation.

The factory default setting is for supply monitoring on 'I/P 1'.

! These connections are used to connect a detector to an addressable Fire Panel when a suitable APIC card (see sections 8.4 and 11) is fitted to the 'Addressable Interface' connector on the left hand edge of the detector main PCB.

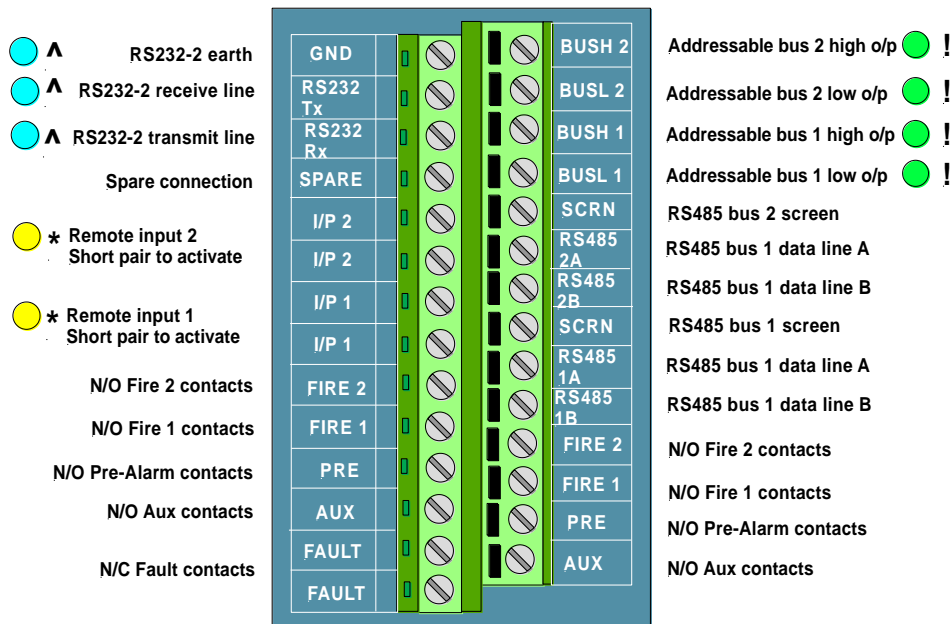


Cablng the Detector and Command Module to the FireFinder Loop

6.3.2 Command Module terminal block connections

All electrical (power and signal) connections should be made to the green terminal block inside the detector. Power cables should be screened and of sufficient current carrying capacity. Signal cable should be 120Ω screened twisted pair such as Belden 9841 0.22mm². Power and signal cables should enter the detector via metal cable glands.

Terminal block connections are as described below.



N/O = Normally open - - rated at 500Ma @ 30VDC

N/C = Normally closed - - rated at 500Ma @ 30VDC

● * These connections can be used as the input terminals for mains supply and battery fault sensing. When this is the case, the contacts will signal a fault when the contacts are open rather than closed, as fault relays operate in the opposite sense to other relays, i.e. they are open for normal operation.

The factory default setting is for supply monitoring on 'I/P 1'.

● ! These connections are used to connect a Command Module to an addressable Fire Panel when a suitable APIC card (see sections 8.3 and 11) is fitted to the 'Addressable Interface' connector on the left hand edge of the Command Module main PCB.

● ▲ These terminals can be used to connect the Command Module to an RS232 (serial) modem for external communications (see section 6).

6.3.3 Connecting power cables

For the system to meet full EMC compliance requirements, the following precautions should be taken:

Screened power cable should be used.

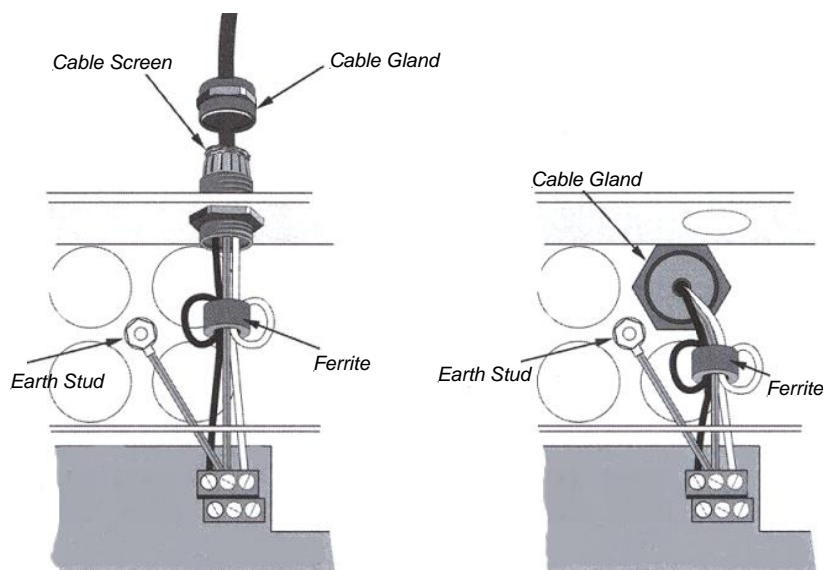
The earth wire of power cables should be connected to the detector EARTH terminal, and this in turn connected to an earth stud on the detector chassis.

All cables (power and signal) should pass through the screw-in metal cable glands provided. The screen of the power cable should be terminated at the cable gland.

Power cables need to be fitted with a ferrite ring inside the detector case (2 off provided). The 24V and 0V wires should be long enough to form a loop around the ferrite wall.

Separate wires from the power cables should be kept as short as possible, just enough to provide adequate stress relief.

Diagrams below show the appropriate arrangements for top and rear entry cables.




Top Cable Entry Option

Rear Cable Entry Option

6.4 Power Supply Connections

The detector can be powered by any monitored 24DC power supply of sufficient capacity which complies with AS4428 Part 5 or NZ4512.

Compliant 2 & 6 Amp external power supply / charger and sealed lead acid batteries can be supplied with the Detector and / or Command Module. If either are part of a **FireFinder** FACP system they can be powered from the fused AUX Power O/P on the Brigade Board within the **FireFinder**.

 **Note:** the safety earth connection must be separate and not connected to the GND or V (ØV) connection.

6.4.1 External power supply

The 302-589 (2 Amp), 302 543 (6 Amp) power supplies provide the 27VDC to charge batteries and supply power to the FastSense Command Module or FastSense Detectors.



Features

Efficiency, size and heat dissipation are improved over linear designs by using a switch mode DC-DC converter as a regulator. For reliability and safety, the converter is current limited.

The power supply also provides supervision of the battery condition and a facility for battery test.

The output of the power supply, battery charger and battery condition is continuously monitored by supervisory circuits.

Top, side and rear knockouts are incorporated into the panel for access.

There is a facility for indication of an external circuit breaker trip (27VDC IN).

The cabinet door is 003 keyed.

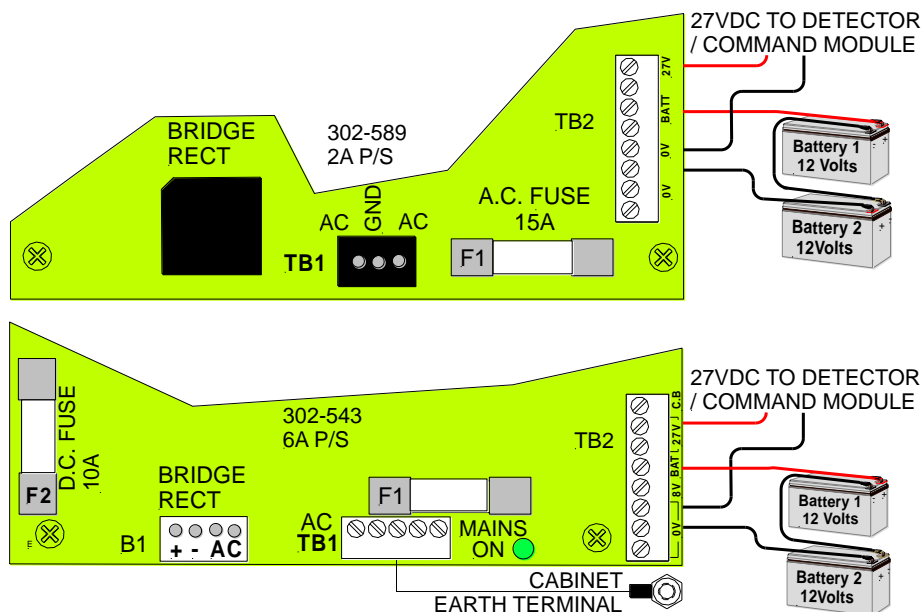
Specifications

	302-589 2Amps	302-543 6Amps
Input voltage	240VAC to 30 VAC + 6% - 10%	240VAC to 30 VAC + 6% - 10%
Size	300H X 350W X 130D	320H X 500 X 130D
Regulated Output		
Output Voltage	27VDC	27VDC
Output Current	2A	2A
Regulation	±0.1V (<1%)	±0.1V (<1%)
Current Fold Back	Set at 2 Amps	Set to 6 Amps
Short Circuit Current	1.8 Amps	
Maximum Battery Capacity	7AH	12AH
Door Holder Output		
Output Power	30W max	N/A
Output Voltage	28V ±3V	N/A
Output Current *	1 Amp	N/A
* Maximum recommended output, this output is <u>NOT</u> current limited or fused. If used external fusing is essential.		

6.4.2 Backup batteries

The power supplies fitted with 2 x 12V, backup batteries to give up to 24 hours' operation in the event of mains power failure. The battery charger can recharge the batteries to a minimum of 80% capacity within 24 hours of mains reconnection to comply with AS4428 part 5 or NZ4512. These fit to the sides of the power supply, which are secured with four screws each. The batteries are fitted with clip on supply terminals.

To avoid current surge it is recommended that the batteries are fitted with the unit powered up.



Batteries connection to the 2 and 6 Amp power supplies

6.5 Demonstration Mode

In normal use, the detector remains in a reduced sensitivity mode for 24 hours whilst it gathers information about its environment. For purposes of demonstration, e.g. to verify a new installation, this may be disabled by putting the detector into "Demonstration Mode". This special operating mode bypasses the 24-hour learning process and allows the detector to operate at a high sensitivity after only 15 minutes learn time.

On the Minimum Display Detector, Demonstration Mode can only be set from a PC connected to the detector's serial port and running the remote control software (see the Remote Software Guide).

To enter Demonstration Mode, the Standard Detector or Command Module Detector must be in FastLearn mode. Whilst FastLearn is running, hold down the front panel <RESET> button and whilst holding this, simultaneously press the <TEST> and <ISOL> buttons. The <RESET> and <ISOL> buttons do not need to be enabled for this function.



Note: *there is no indication on the Minimum Display Detector to show that it is in Demonstration Mode, so be sure to set the detector back into FastLearn mode as soon as the demonstration has ended.*

When entering Demonstration Mode, the detector front panel LCD display will show the legend **Demo mode** and the time and date on which this was invoked.



IMPORTANT NOTE *Demonstration Mode should only be used for demonstrations. It should not be used as a substitute for normal operation as the alarm settings in this mode are based solely on the sparse data gained during the 15-minute FastLearn period. Over time, this would lead to nuisance alarms due to normal variation in the detector's environment. To cancel Demonstration Mode, invoke a new FastLearn (see section 3.4.8).*

7 External Communication

7.1 BMS protocols on the FastSense PLUS Command Module

The Command Module of the **FastSense PLUS** has a second RS232 port that can be used to send messages to a pager or compatible GSM phone using a modem or to enable connection to a Building Management System (BMS). This comprises the terminals "RS232 Tx" (transmit), "RS232 Rx" (receive) and "GND" on the green terminal block inside the unit (**see section 5.3.2, 'Command Module' terminal block connections**).

Set-up of the Command Module is done using three functions; BMS protocol , Page on fault and Page on alarm (**see sections 3.4.33, 3.4.41 and 3.4.42 respectively**).

When either Page on fault or Page on alarm is enabled the second serial port is reserved exclusively for paging purposes by setting BMS protocol to 0 (TAP paging).

Programmable function BMS protocol sets the communications format that is used by the second serial port to communicate with the BMS. Setting BMS protocol to anything other than 0 (Tap paging) will disable functions Page on fault and Page on alarm if they are enabled.

BMS Protocol numbers are as follows:

Protocol number	protocol
0	TAP paging (default).
1	Output only. Events are sent in the same Ascii text format as the internal event log display. This may be used to drive a serial printer if required.
2	BACnet ANSI/ASHRAE standard 135-1995.

7.1.1 Text output support (protocol 1)

Text is output at 9600 baud, 8 bit with no parity. When an event occurs the event is printed in the following format:

Device 'Command Module' or 'Detector n'

Event 'Fire 1'

Time date 10:32 21/03/2001

7.1.2 BACnet support (protocol 2)

The Command Module models the attached detectors as analogue value object types instances 2 to 128. The Command Module status is stored as analogue value instance 1. The Present_Value property of the analogue objects can have one of the following values; 0 = Disabled; 2 = Fault; 32 = Normal; 48 = PreAlarm; 64 = Fire 1; 128 = Fire 2.

The device object supports the following Properties:

Object_Identifier
 Object_Name
 Object_Type
 System_Status
 Vendor_Name
 Vendor_Identifier
 Model_name
 Firmware_Revision
 Application_Software_Version
 Protocol_Version
 Protocol_Conformance_Class
 Protocol_Services_Supported
 Protocol_Object_Types_Supported
 Max_APDU_Length_Accepted
 Segmentation_Supported
 APDU_Timeout
 Number_Of_APDU_Retries

The following Properties are supported by the analogue value objects:

Object_Identifier
 Object_Name
 Object_Type
 Present_Value
 Status_Flags
 Event_State
 Out_Of_Service
 Units

For further information on BAC net implementation consult the Technical Manual.

7.1.3 Paging from the Command Module

The **FastSense PLUS** Command Module has the facility to send text messages to alphanumeric pagers or SMS messages to some mobile phones.

In order to send messages to a pager or similar device a modem must be plugged into the RS232TX and RS232RX terminals of the Command Module using a suitable cable. (see section 5.3.2 "Command Module terminal block connections").

The call centres of the pager or SMS-capable phone must support the TAP protocol. Please contact your pager provider to check whether they provide access with the TAP protocol.

7.1.4 6.1.4 Configuring the software

No manual configuration of the modem is required as the command module configures the modem automatically on dialling.

The command module has three entries used to send messages. They are described below with an example for a BT pager. The functions may be found in Setup menu Pager .

Call centre

This is the phone number the modem dials up to send a message.

Password

This is an optional password used to access the system.

Pager

This is the number of the actual pager. This number will be detailed in the pager or SMS phone documentation.

8 Event log

An event is defined as operation of any of the front panel controls (when enabled), a signal received from a remote source (e.g. the master controller or PC), a detector level exceeding the **Aux.**, **Pre-Alarm**, **Fire 1** or **Fire 2** thresholds or certain commands sent from the remote software or SenseNET. The event log will also store items such as day and night start times, demonstration mode, power fault, detector fault etc. The detector keeps a log of the last 200 events for reference purposes.

The event log can be downloaded using a PC that has the remote software installed and is connected to the **FastSense PLUS**' RS 232 port using a serial cable. **See section 8.5, 'Connecting to a PC'**.

The event log can also be viewed in the Log menu, 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 (200 events are stored) and a new event occurs, the oldest event in the buffer is discarded.

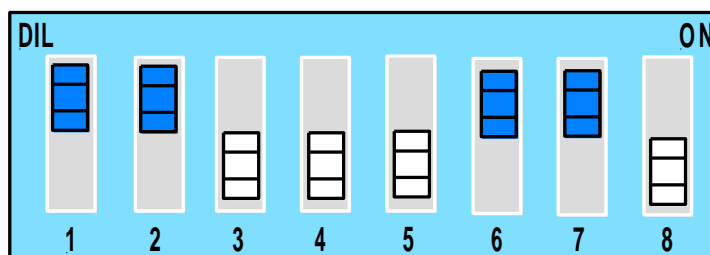
9 Interfacing

Because of the flexible nature of the **FastSense PLUS** 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.

9.1 Setting the detector address

In order to identify itself to the 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 red DIP switch SW1 at the bottom left of the opened detector on the main circuit board.

The switch settings are up for 1 and down 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 11000110 in binary, or $(1 \times 1) + (1 \times 2) + (0 \times 4) + (0 \times 8) + (0 \times 16) + (1 \times 32) + (1 \times 64) + (0 \times 128) = 99$.

The full range of available addresses and their relevant switch settings are in section 8.1.1 for reference.



IMPORTANT NOTE DO NOT USE ADDRESS "0"

9.1.1 Address table

Addresses chosen for detectors do not have to be consecutive or in a given order as 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

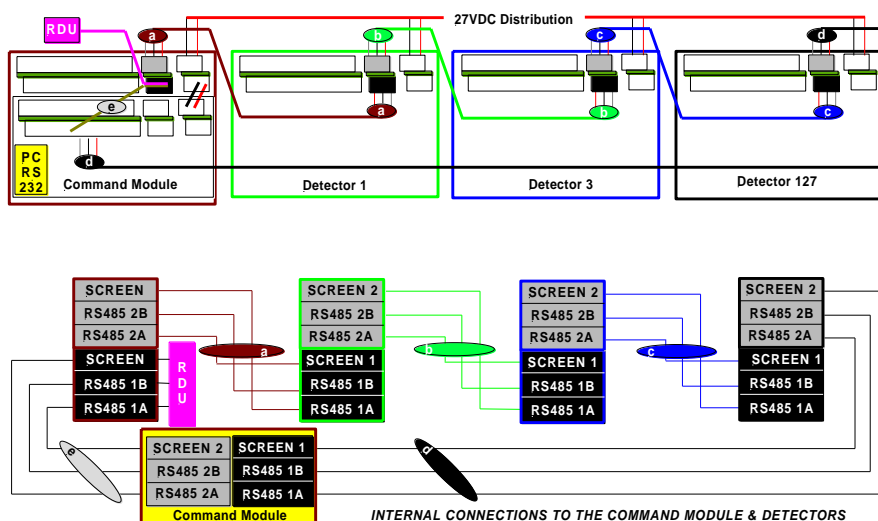
9.2 Connecting a detector network to a command module

120 ohm screened twisted pair such as Belden 9841 24 AWG should be used for all loop connections. The RS485 A and B wires should be taken through a ferrite (supplied) with a single loop illustrated for the power wires in section 6.3.3. The total length of interconnecting cable between adjacent FastSense detectors in the loop should not exceed 1.2 kilometres.

The detectors are connected using the RS485 connections on the terminal block (see sections 5.3.1/5.3.2) RS485 1A and 1B are the signal connections for bus 1 and RS485 2A and 2B are the signal connections for bus 2. SCREEN 1 and 2 are the screen connections for buses 1 and 2 respectively.

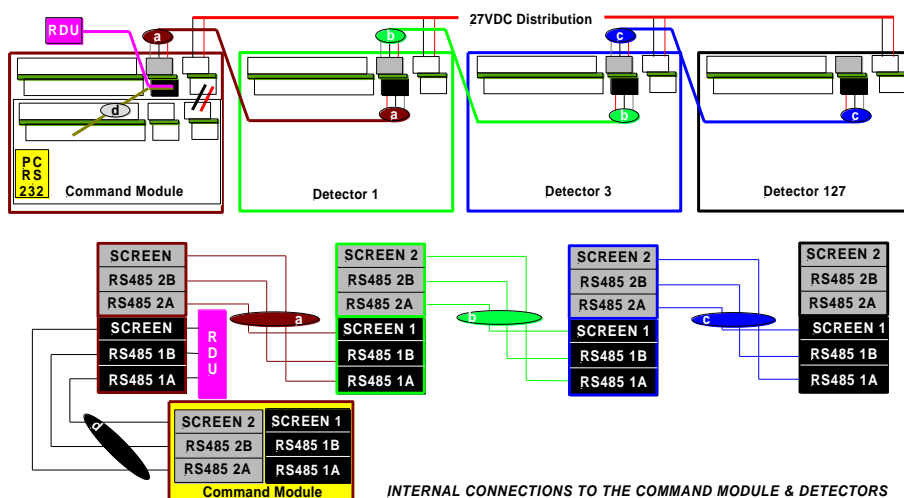
For the Command Module, the RS485 1A and 1B connections may be thought of as the 'Send' lines, and 2A and 2B the 'Return' lines. For each detector on the loop, the 1A and 1B connections may be thought of as the lines from the previous detector on the loop and the 2A and 2B connections the lines to the next detector in the loop.

9.2.1 Fault tolerant detector loop configuration



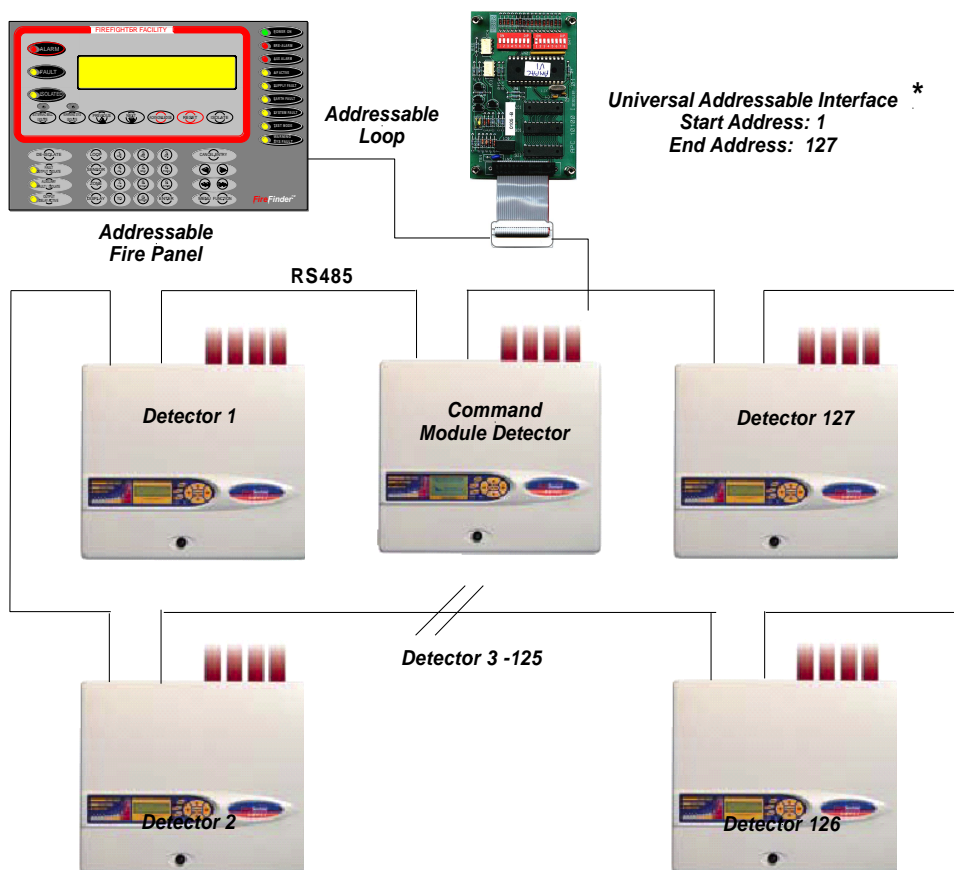
It should be pointed out that loop connections such as above are only needed for a fully fault-tolerant network where full isolation is required between detectors. If all detectors are operating within the same zone a series connection can be used where the output from the command module is taken from the Bus 2 terminals and the last detector in the loop does not require to be connected back to the command module as shown below. In this example, the Command Module will not be able to monitor the network for communications problems but less wiring is required.

9.2.2 Non-fault tolerant serial configuration



9.3 Connecting a Command Module to an addressable Fire Panel

When a Command Module is being used to manage one or more detectors (the maximum limit is 127) then an Addressable Protocol Interface Card (APIC) may be used to decode detector status information in the Command Module and relay to the Fire Panel via the Addressable Bus 1 and Bus 2 terminal block connections (see section 5.3.2 'Command Module terminal block connections' and section 11.1, 'APIC cards'). In this configuration only one interface is required and all detector information is available through this interface, one address per device.

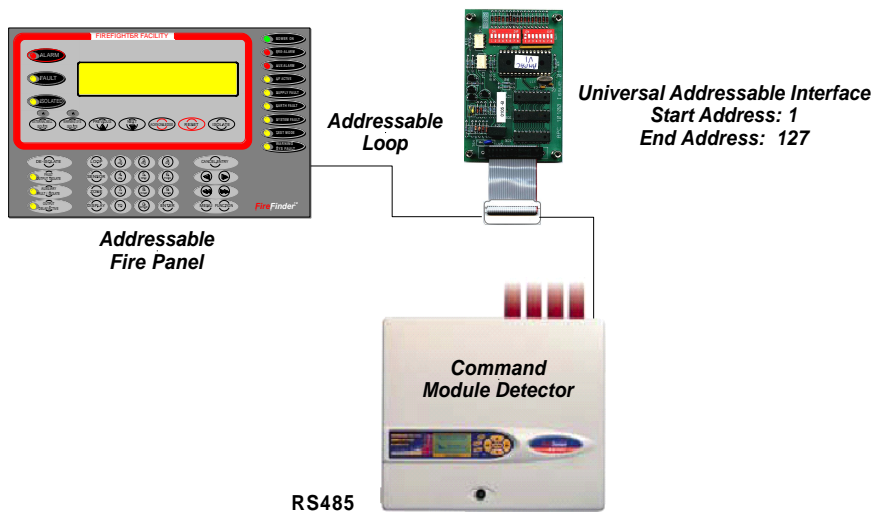


* It is not essential in networks of less than 127 detectors that a continuous unbroken range of detector addresses is used, merely that all addresses are different and that the full range of addresses is set on the APIC. However, any unused addresses would then show up on the fire panel as in fault (detector not present). It is therefore recommended that, when using an APIC to communicate to a fire panel, an unbroken, consecutive range of detector addresses is employed.

Note: some addressable protocols may limit the maximum number of device addresses to less than 127. 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 of the available alarm levels and fault reporting is usually a general fault with no detailed fault information.

9.4 Connecting a single FastSense PLUS to an addressable Fire Panel

An APIC may be used to decode detector status information and relay this to the Fire Panel via the Addressable Bus 1 and Bus 2 terminal block connections (see section 5.3.1 'Detector terminal block connections' and section 11.1, 'APIC cards').



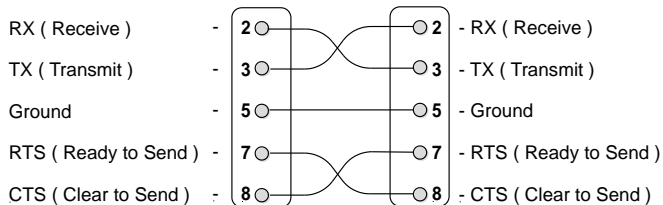
Note: The detector address on the RS485 communications loop and the Fire Panel addressable protocol address are the same i.e. no address translation is performed. Some protocols may not support all of the available alarm levels and fault reporting is usually a general fault with no detailed fault information.

9.5 Connecting to a PC

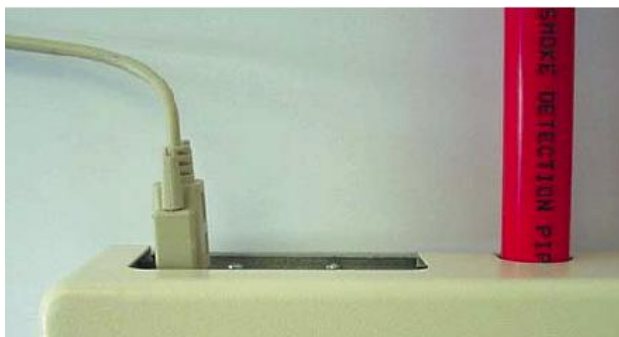
To connect a single standalone detector to a PC, connect the PC's serial port directly to the detector's 9-way RS232 port. Connections for this cable are shown below.

9 Pin Female " D " Connector

9Pin Female " D " Connector



A suitable cable is a 'Null Modem Cable', available from most electronic retail stores.



When multiple detectors are networked together and a Command Module is being used, the PC connects to the Command Module's 9-way RS232 port. The cable connections are the same as the standard detector cable connections.

10 Commissioning

10.1 Commissioning checklist

ⓘ IMPORTANT NOTE

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.

1. Before powering up the detector, check that all power and signal wiring is correct.

A point-to-point continuity check is recommended, if possible.

2. Ensure that all sampling pipes are seated firmly and securely in their inlet ports, and at pipe joints and sockets.

3. Ensure that all sampling pipes have been drilled with the required number of sampling holes or capillary sampling points.

4. Power up the detector.

5. Set an appropriate ClassiFire alarm factor for the protected area (see section 3.4.5).

6. Check that the LED bargraph display starts to scroll (Standard Detector and Command Module) or the green "OK" LED starts to flash (Minimum Display Detector).

7. Before the 15 minute FastLearn period has ended, set the detector into demonstration mode (see section 5.5).

8. Wait for the FastLearn period to finish. On Standard Detectors, the "rolling" LED indication will stop, and on Minimum Display Detectors the green "OK" LED will stop flashing.

9. Check that no faults are indicated on the detectors and Command Module.

10. Isolate the detector from the main fire panel.

11. Carry out suitable smoke tests, preferably by putting smoke into the sampling holes furthest from the detector, and ensure that the detector registers the smoke within a suitable period of time as required by relevant legislation (for LPCB installations, this is 120 seconds).



Note: Do not use synthetic aerosol can smoke to test the detector, as this can leave acidic residues which can damage the detector internals.


12. Enabling the RESET button as required (see section 4.3.24), clear any alarm indications and check that the Fault LED is unlit. Standard Detectors and Command Modules should display the message Normal Operation on their LCD screens.

13. Ensure that the smoke has entirely dissipated before passing to the next step. NB, any smoke remaining in the atmosphere will be accepted as part of the normal background during the next FastLearn operation.

14. Set the detector back into FastLearn and leave it for a full 24 hours to reach maximum sensitivity. The detector will be unable to signal alarms during the 15 minute FastLearn period, and will operate at a reduced sensitivity until the 24-hour learning period is finished. At the end of the learning period, the detector will be at the optimum sensitivity for the protected area.

11 Maintenance

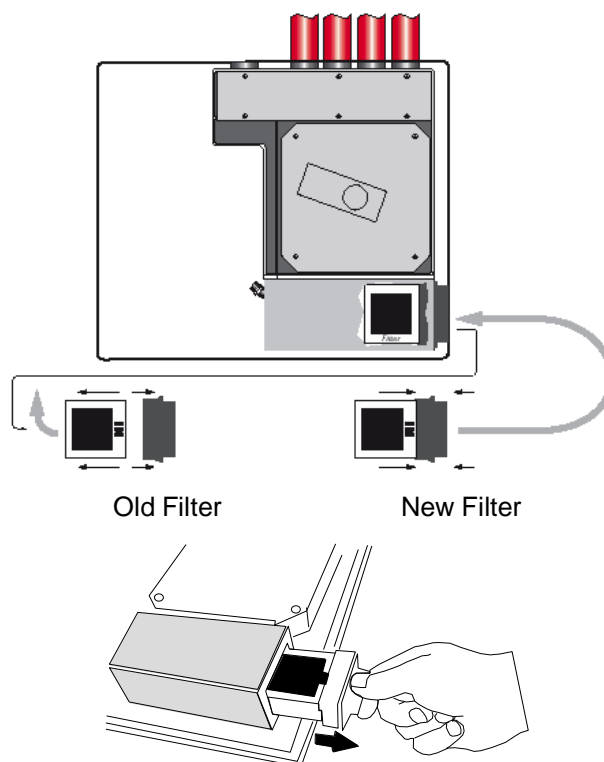
FastSense PLUS is a very low maintenance detection system. If required, external cleaning of the unit should be performed using a damp (not wet) cloth. Do not use solvents as these may mar the display bezel. The only part that may require field replacement during servicing is the dust separator assembly. The dust separator condition can be checked using the Dust Separator test in the Diagnostics menu, which gives a percentage reading of dust separator efficiency. When this level drops to 80% the detector will signal a Separator renew fault and the dust separator will need replacing.

 **Note:** 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.

The following illustration shows how the dust separator is replaced. Make sure to push the separator fully home, or the detector will fail to register its presence, and will continue to indicate Separator change.

Open the front cover using the key provided, and locate the dust separator tab at the bottom right of the detector as shown. Remove the black end piece with the removal tab from the filter element and dispose of the element. Check inside the dust separator recess for any fine dust that may have passed through the dust separator. This can be removed with a dry air spay or cotton buds.

Fit the new element into the plastic end piece and slide into the detector. The filter should be fitted with the legend 'IN' towards the front of the detector. If the filter is inserted the wrong way up, the detector will not register its presence and the Separator change legend will stay on the display. When the replacement filter is fitted, the detector will automatically start a FastLearn routine.



A suggested series of checks for periodic planned maintenance is given as follows;

At three month (Quarterly) intervals:

1. Isolate the detector from the main fire panel.
2. Inspect the front cover for signs of physical damage, moisture ingress and ensure that the detector is securely mounted to the wall.
3. Rectify any faults as indicated on the detector or Command Module LCD display, or at the fire panel
4. Check the correct operation of all front panel buttons (enable where necessary).
5. Remove all power from detector
6. Ensure all field wiring is secure and that any insulation material is undamaged.
7. Ensure that the exhaust port is not blocked or obstructed.
8. After first taking the relevant safety precautions i.e. safety glasses, respiratory mask and gloves, use an air duster to remove any dust or debris from inside detector.



Note: *Health & Safety Notice. Unless suitable precautions are taken maintenance personnel may be exposed to "Nuisance Dust" hazard as defined by the Control of Substances Hazardous to Health Regulations*

9. Restore power to the detector.
10. Carry out a functional smoke test, introducing smoke into the sampling holes farthest from the detector. Allow the smoke to fully disperse and the bargraph level on the relevant detector to return to normal before proceeding further.
11. De-isolate the detector from the main fire panel and place the relevant loop or zone of main fire panel in to test or commissioning mode to allow relay testing.
12. Verify the correct operation of all relays through to main fire panel.
13. Ensure no existing faults or alarms are indicated on the detector front panel before restoring the main fire panel to normal operation.

At six monthly intervals:

The procedures listed below should be carried out in addition to those listed in the Quarterly inspection.

1. Isolate detector at main fire panel to avoid a fault condition being reported
2. Check physical condition of batteries, test batteries to ensure that they hold sufficient charge to provide the required standby time
3. Check integrity of sampling pipe network.
4. Ensure no existing faults or alarms are indicated on the detector front panel before restoring the main fire panel to normal operation

At twelve monthly intervals:

The procedures listed below should be carried out in addition to those listed in the Half Yearly inspection.

1. Remove all power from the detector
2. After first taking the relevant safety precautions i.e. safety glasses, respiratory mask and gloves remove aspirator (four screws in the base of the aspirator, not in the metal top plate), clean the plenum area and aspirator using an air duster.



Note: *Health & Safety Notice. Unless suitable precautions are taken maintenance personnel may be exposed to "Nuisance Dust" hazard as defined by the Control of Substances Hazardous to Health Regulations*

3. Refit aspirator and restore all power to the detector.
4. Ensure no existing faults or alarms are indicated on the detector front panel before restoring the main fire panel to normal operation.

12 Optional Extras

12.1 Addressable Protocol Interface Card (APIC's)

General

An Addressable Protocol Interface Card (APIC) can be fitted to an individual FastSense detector or a command module to decode detector information and to relay this information to and from an FACP. That is to say an APIC can be used as a single loop interface unit, or when used with a command module one APIC can be used to communicate data to and from up to 126 FastSense units (via the one APIC module.)

Loop connections

The connections to the Fire Panel loop are made using the BUS L1 (-ve) and BUS H1 (+ve). The return leg of the loop is BUS L2 (-ve) and BUS H2 (+ve).

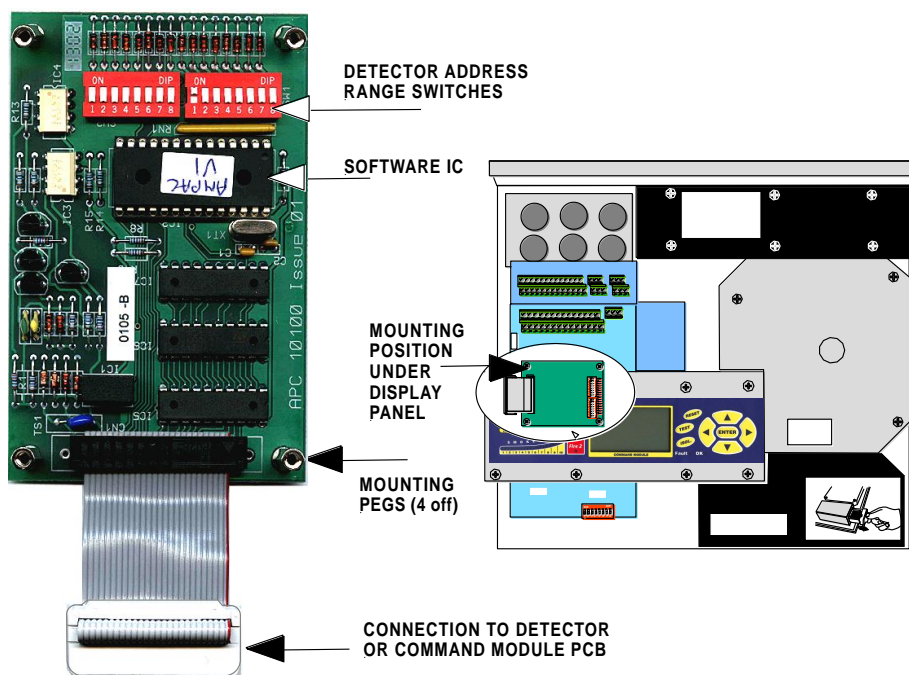
If a FastSense unit is fitted to a command module the loop is connected to the BUS connections on the command module.

Mounting

The APIC is fitted to either the command module or any of the three FastSense PCB's using the screws and standoffs supplied: There are four mounting holes on each unit into which the standoffs will fit.

The only connection between the APIC and the host module is via a 26 way ribbon cable.


An example of an APIC card is shown below.



Full antistatic precautions must be taken when fitting the card. The APIC card connector is fitted into the 26 way addressable bus socket on the left-hand side of the detector PCB and "INTERFACE" on the Command Module PCB. Push the four mounting pillars on the base of the card into the four holes on the Command Module or detector main board included for the purpose.

At the detector terminal blocks there are two addressable buses. Bus 1 connects to the "loop in" terminals on the fire panel (or equivalent), and Bus 2 connects to the "loop out" terminals (or equivalent). For each bus, there is a high (positive) and low (negative) connection, so the Bus 1 positive connection is labelled as "BUSH 1", the Bus 1 negative connection as "BUSL 1" and so on.

Detectors and Command Modules can be supplied with APIC cards fitted if requested. Please specify the communications protocol required on the order.

 **Note:** When first ordering APIC cards, it is advisable to check with Ampac that an APIC with the required communication protocol is available before ordering.

Address settings

There are two address switches on the APIC, SW1 and 2.

If only a single loop address is required, both switches are set to the same address, e.g if the sensor address is 4 then both SW1 and SW2 are both set to address 4.

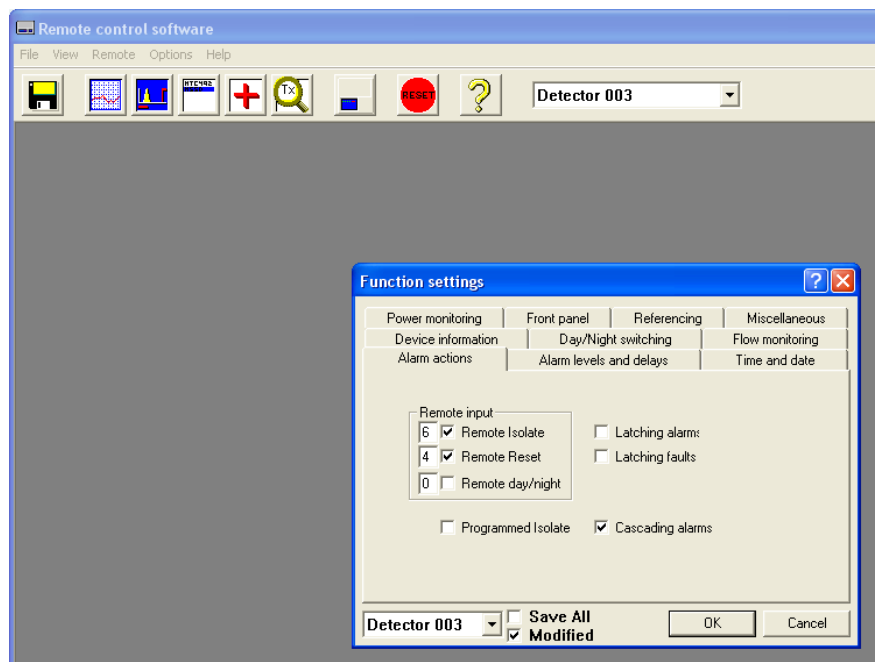
When used on a command module if multiple FastSense units are required to communicate with the FACP then the address switches on the APIC must be set to match the desired range of addresses.

If an APIC is monitoring 4 FastSense units the APIC start and finish addresses must match the required loop addresses and the FastSense units must also correspond to the same addresses.

Example 1

There are 4 detectors fitted to an addressable loop. The next device on the loop is an APIC connected to a single FastSense unit. The APIC address switches are both set to 5.

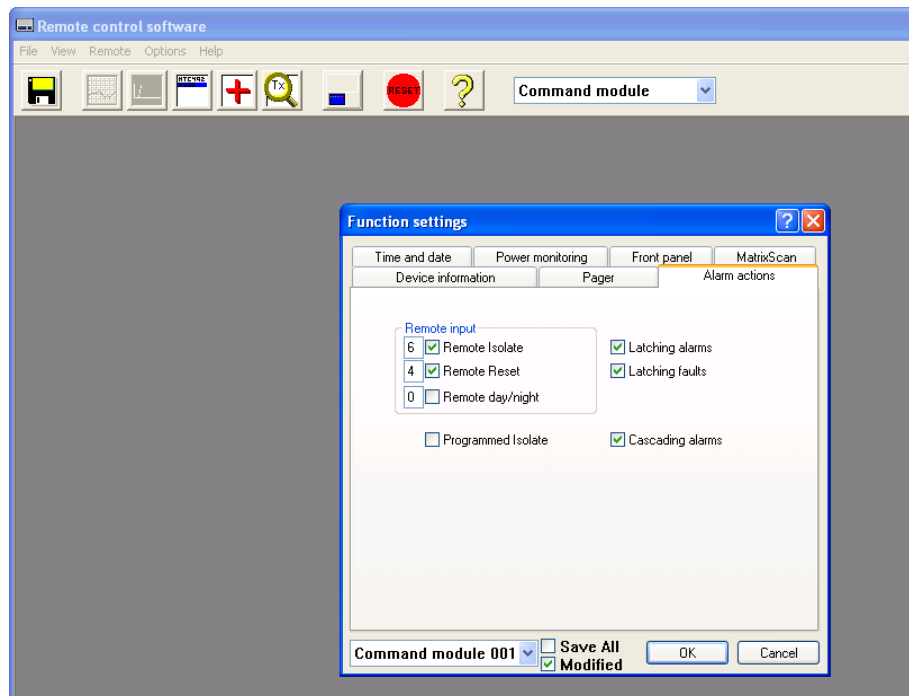
On the FastSense unit the Alarm actions boxes must be set as shown below.



Example 2

There are 7 detectors fitted to an addressable loop. The next device on the loop is an APIC connected to a command module which has a Sensenet communications loop fitted with 5 FastSense units connected. The first APIC address (SW1) switch is set 8 and the second address switch (SW2) is set to address 12.

The FastSense units do not require any inputs selected in the alarm option boxes.



Note: 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.

Note: The setting is dependent on the **FastSense** unit software

Versions lower than V2.1

Remote isolate is input 6

Remote reset is input 4

Versions higher than V2.1

Remote isolate is input 3

Remote reset is input 1

No further action is required by the FireFinder programmer as the software automatically assigns these outputs in the application software.

When an APIC is connected to a FireFinder and the classifier override is required then the remote day night box must be ticked and the number 5 placed in the corresponding box. In addition to this the classifier override percentage must be set to 101 or greater. This sets the percentage that is added to the detector when it is required to de-sensitise the detector.

The Classifier Override feature must be programmed into the FireFinder using a function in order for this feature to work.

Reporting to **FireFinder**.

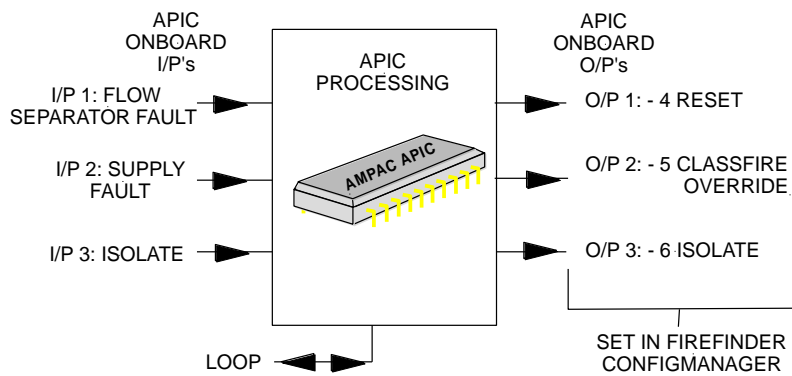
FastSense Plus will report the following to **FireFinder**.

Status	Count
Fault	4
Normal	16
Aux alarm	32
Pre-Alarm	48
Fire 1	64
Fire 2	127

Bit	Use
Flow/seperator fault 1	1
Mains/battery fault	2
Detector Isolated	3

The three output bits from the fire panel are monitored as inputs 1 to 3 or 4 to 6 depending upon the detector type as follows:

It is possible to reset, isolate and activate Classfire Override (Remote Day / Night settings in ConfigManager) on the *FastSense Plus* from the **FireFinder**

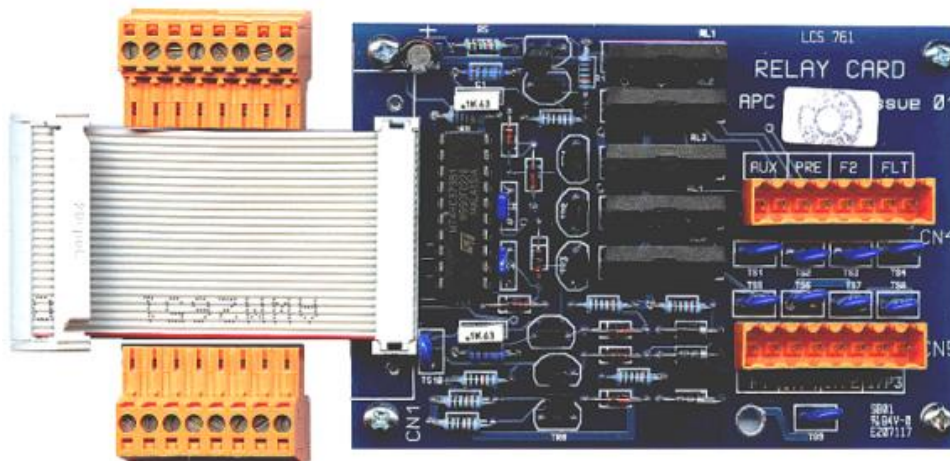


12.2 Input / Relay Card

The main use of this card is to provide three extra remote inputs, which can be used with ClassiFire override (see section 4.3.4), remote day / night switching (section 4.3.14), remote reset (section 4.3.15) remote isolate (section 4.3.16), battery monitoring (section 4.3.26) and mains power monitoring (section 4.3.27). It also provides additional relay outputs for the fire and fault relays.

The additional remote inputs are labelled "I/P 1", "I/P 2" and "I/P 3", but when assigning the terminals to a remote function, these are assigned remote input numbers 4, 5 and 6 respectively. ClassiFire® override will only function on remote inputs 3 or 6 (Input / Relay card "I/P 3").

As with the remote input terminals on the detector on the Command Module, the functions are activated by shorting the terminals together.



The card is fitted to the main detector PCB in the same way as APIC cards (see section 11.1), with the ribbon cable plugging into the ADDRESSABLE INTERFACE 26-way connector, and the mounting posts fitting into the holes on the PCB. Note that an Input / Relay card cannot therefore be used at the same time as an APIC card. Due to space constraints, an Input / Relay card cannot be fitted to the detector board on a Command Module detector, and the card has no current use on the Command Module.

The remote inputs are wired up to their activating switches from the card. For ease of installation, the terminal blocks can be removed from the card for wiring, and a separated terminal block is shown in the illustration. Note the orientation of the terminal blocks, as they will only fit easily into the card connectors one way round.

The terminals are in pairs labelled as follows:

AUX: Secondary auxiliary alarm relay terminals

PRE: Secondary pre-alarm alarm relay terminals

F2: Secondary Fire 2 alarm relay terminals

FLT: Secondary fault relay terminals

F1: Secondary AUX alarm relay terminals

I/P 1: Detector remote input 4

I/P 2: Detector remote input 5

I/P 3: Detector remote input 6

Detectors can be supplied ready-fitted with input / relay cards if requested.

13 Trouble shooting

13.1 Pressing RESET or ISOL. button has no effect

- Check that the controls have been enabled. These functions are disabled by default. See section 3.4.24

13.2 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 3.4.5**
- Check that the detector is not in Demonstration mode. This can be ascertained by viewing the event log (**see sections 3.4.43 and 7**) 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 3.4.8**)
- From the event log (see sections 3.4.43 and 7), 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 3.4.6).

13.3 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 unused sampling pipe ports are closed and that sampling pipes are firmly and cleanly seated in their ports and undamaged
- Check that the correct ClassiFire alarm setting has been set (see section 3.4.5)
- Check that the detector has either had a 24 hour learning period or that it has been placed in demonstration mode

13.4 Low mean output

- Check that the filter does not require changing (**see section 3.4.47**) 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 cleaning. The detector is not designed to handle large quantities of coarse debris and dust.

13.5 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.

13.6 Flow fault errors

- These occur when the airflow rate into the detector exceeds the pre-programmed parameters. 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 nominal flow.

13.6.1 "Low flow" error messages.

- Check that the pipe giving the error is not blocked.
- Check that, if the pipe is unused, the flow sensor for this pipe has been disabled (**see section 3.4.30**).
- Check that the low flow fault threshold is not set too high (**see section 3.4.30**).
- Consider increasing the aspirator (fan) speed (**see section 3.4.28**).

13.6.2 "High flow" error messages

- Check that the pipe is pushed home into the inlet and is not broken or cracked
- Check that installed pipework is fitted with an endcap. *PipeCalculator* pipe modelling software prompts the use of appropriate endcaps. **Open bore pipes are not recommended.**
- Check that the high flow fault threshold is not set too low (**see section 3.4.30**).
- Consider reducing the aspirator (fan) speed (see section 3.4.28).

13.7 Cannot refit the front cover

- Check that the recessed top edge of the cover is securely located behind the locating guard rails on the chassis (**see section 5.2.1**).
- Check that the key is turned to the unlocked position (anticlockwise).

13.8 No display

- Check that the display ribbon cable is securely connected to the detector/ command module main board and to the display board as appropriate (**see section 5.2.1**).
- Check that the display ribbon cable has not been damaged.

13.9 The Event Log and Fastlearn

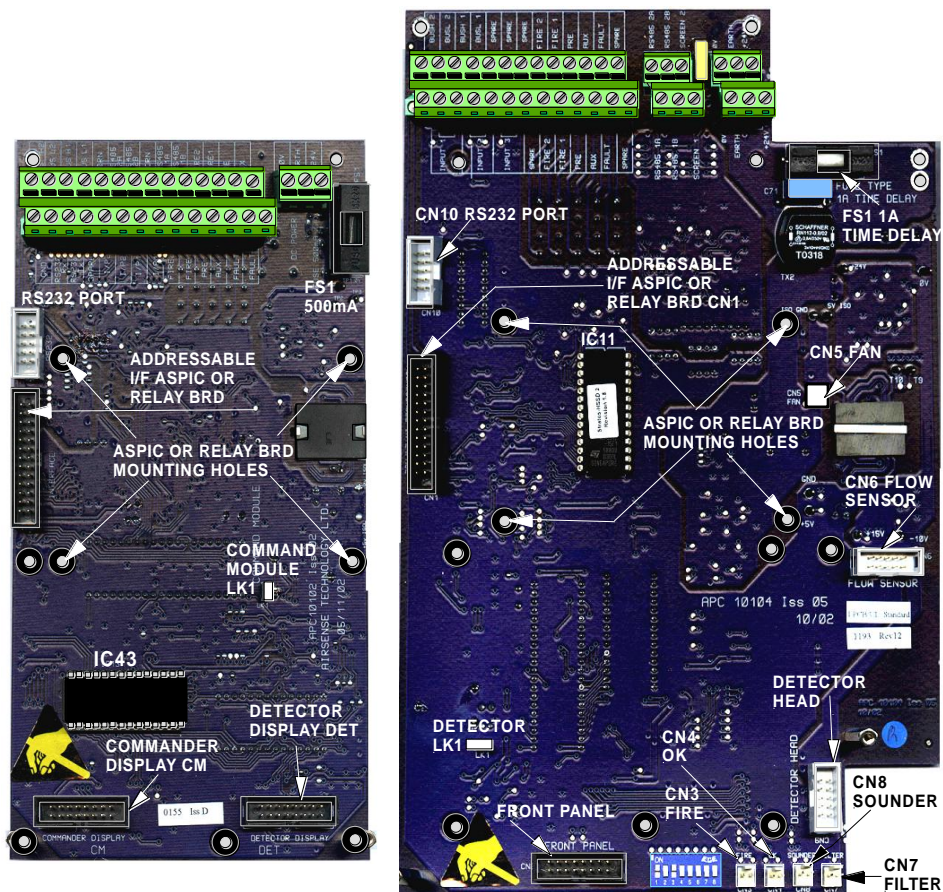
- *Detector event log shows several FastLearn operations in succession.*
- The detector assesses the background smoke level of the protected area during the 15-minute FastLearn period. If it is too high or variable for the alarm factor chosen, the detector will select the next higher alarm factor and repeat the process until the alarm factor is the most sensitive that can be set without causing nuisance alarms.

13.10 Garbled Characters on the LCD

The detector or Command Module shows garbled characters on the LCD screen or does not accept function updates.

This may be because the contents of the detector's or Command Module's battery backed-up Random Access Memory (RAM) has become corrupted. This may be due to frequent power spikes or glitches, in which case a history of Watchdog resets may be a clue to this.

To reset the RAM contents, it is necessary to remove and replace the memory reset link LK1 on the detector or Command Module main board.



To reset the RAM, power down the unit and locate the link on the board as shown above. If any disassembly of the unit is required to reach the link, ensure that all connector placements are noted. Taking appropriate antistatic precautions, lift off the jumper and wait 30 seconds before replacing it. Power up the unit.

All functions will be reset to their default conditions after a RAM reset, the stored time will revert to 00:00 and date to 01/01/00.

The unit should now function properly. If faults are indicated, e.g. flow faults, check that the relevant connectors have been properly refitted.

14 Error messages

The FastSense PLUS text display can provide a wide range of information about the detector. A list of error messages follows with a brief explanation of their meanings.

Separator renew : The dust separator requires replacement. See section 10, 'Maintenance'

Separator change : The dust separator is missing or improperly fitted. See section 10, 'Maintenance'

Bad value , Bad time , Bad date :A value has been input into a function, which is outside the parameter range for that value. Take note of the range of values allowed (in brackets) and try again.

Bad detector :A detector address has been entered which is either outside the allowed range or which is not present on the loop. This may also happen if the user has entered address 000 (command module) for a function which it does not support (e.g. alarm factor)

No response : The Command Module has unsuccessfully attempted to read a function value from a connected unit. Check that the unit connected supports this function.

001 x 002

Loop break : There is a break in the communications loop between the detector addresses specified. Check the wiring.

Comms fault : The detector has polled a detector and no response has been received after the specified poll timeout value.

Bad access code : An incorrect access code has been entered. Enter the correct code.

Battery fault : This indicates either that the standby battery has discharged to a predetermined level or that no standby battery is fitted. In the former case, the battery should be replaced and recharged. In the latter case, the battery check should be disabled (see section 4.3.26). It is important that the battery fault be acted upon as soon as noticed, as excessive discharge may cause damage to the battery. The battery fault condition comes on before the battery reaches this portion of the discharge curve.

Watchdog reset : This indicates that there has been a power supply fault. If there are frequent power outages it may be advisable to power the unit from a UPS.

Detector fault : This indicates that there is a problem with the detector head. This may be due to a number of causes. Refer to the chart readout if this can be downloaded to a PC and note the detector signal level at the time of the fault. When as much information as possible has been determined about the conditions at the time of the error, please contact Ampac.

15 Do's and Don'ts

DO

Ensure that the ClassiFire alarm factor is appropriately set.

Ensure that reference detectors 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).

Close unused pipe inlet ports on the detector to ensure optimal operation.

Set different addresses for all detectors in a network.

Remove sampling port bungs before fitting sampling pipes.

Use screened cable for all power and signal connections. The screen should be earthed at the metal cable gland provided.

Leave enough room around the detector when installing to allow removal of the dust separator, fitting an RS232 cable and removal of the front cover.

Use 25mm pipe adaptors if attempting to use sampling pipes of 25mm outside diameter (see section 11.3).

Take proper antistatic precautions whilst changing the software chip.

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 focus has shifted (e.g. after dropping the detector), it should be returned to Ampac for recalibration.

Place the detector near high power RF sources.

Place the detector so close to other equipment that there is insufficient room to access and change the dust separator. See section 10. 'Maintenance'.

Use sampling pipe of less than 27mm outside diameter without a suitable 27mm pipe adapter.

Use excessive force when fitting sampling pipes as this may damage the detector.

Use synthetic aerosol can smoke to test the detector. This is acidic and can damage the detector internals.

Set a detector to address "000". This is reserved for Command Modules.

Attempt to use more than one Command Module in a network.

Forget to cancel Demo Mode after demonstrations and tests by invoking a new FastLearn.

16 FastSense PLUS specification

SELV rating	Class III or AS/NZS3260:93
Supply Voltage	21.6V - 26.4V DC PSU Type: conforming to AS4428 part 5 or NZ4512
Size (mm)	427W x 372H x 95D
Weight	5.2kg (<i>Detector</i>) 5.3kg (<i>Command Module Detector</i>) 6.2kg (<i>Stand-alone Command Module</i>) 10.1kg (<i>Stand-alone Command Module + batteries</i>)
Operating temperature range	-10 to +60°C
Operating humidity range	0 - 90% Non Condensing
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 (<i>Detector</i>) 450mA (<i>Stand-alone Command Module</i>) 850mA (<i>Command Module Detector</i>)
Relay Contact Rating	500mA @3 0VDC
Maximum sampling pipe length	200 metres total
Sampling pipe inlets	4
Sampling pipe internal diameter	15-25mm
Alarm levels	4 (Fire 2, Fire 1, Pre-Alarm and Aux)
Bargraph sensitivity range	0.0015 - 25% obs/m
Bargraph segments	26
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 Data bus cable	Front panel or PC via RS232/RS485 RS485 data cable
Data bus length	1.2 km IN, 1.2km OUT
IP rating	IP50



IMPORTANT NOTE *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.*

NOTES:

UNCONTROLLED DOCUMENT

NOTE: Due to AMPAC's commitment to continuous improvement specifications may change without notice.