CIRRUS PRO
ASPIRATING FIRE DETECTOR

User Manual and Responsibilities

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NOTICE

THESE INSTRUCTIONS DO NOT PURPORT TO COVER ALL DETAILS OR VARIATIONS IN EQUIPMENT NOR TO PROVIDE FOR EVERY POSSIBLE CONTINGENCY TO BE MET IN CONNECTION WITH THE INSTALLATION, OPERATION OR MAINTENANCE OF CIRRUS PRO SYSTEMS.

SHOULD FURTHER INFORMATION BE DESIRED OR SHOULD PARTICULAR PROBLEMS ARISE, WHICH ARE NOT COVERED SUFFICIENTLY FOR THE PURCHASERS PURPOSES, THE MATTER SHOULD BE REFERRED TO PROTEC FIRE DETECTION (EXPORT) LTD.

INSTALLATION SHOULD BE PERFORMED BY AUTHORISED PERSONNEL, WHO ARE TRAINED AND FAMILIAR WITH INSTALLATION PROCEDURES.

LIMITED WARRANTY

Protec Fire Detection (Export) Ltd, warrants the Aspirating Fire Detector described herein to be free from defects in material and factory workmanship and agrees to repair such instruments which under normal service disclose the defect to be the fault of Protec Fire Detection (Export) Ltd manufacturing.

Protec Fire Detection (Export) Ltd's obligation under this Warranty relates to the original purchaser and is limited to the return of the purchase price or, at Protec Fire Detection (Export) Ltd's sole discretion, to the repair or replacement of the detector or any of its parts which, in our opinion and upon examination prove to be defective. For this Warranty to be in effect, notification of any material or part alleged to be defective should be made to Protec Fire Detection (Export) Ltd, in writing, within 12 months from date of delivery.

This Warranty shall not apply to a detector which has been (1) subject to misuse, negligence or accident; (2) connected, installed, operated or adjusted other than in accordance with instructions furnished by Protec Fire Detection (Export) Ltd; (3) repaired, modified or worked on by someone not authorised by Protec Fire Detection (Export) Ltd, so that in our judgement the performance or reliability of the detector has been impaired.

We reserve the right to make replacement with equivalent merchandise and to make changes at any time in the specification, design or construction of the instrument without incurring obligation to make any commensurate changes in units previously delivered.

Protec Fire Detection (Export) Ltd, assumes no liability for consequential or contingent damages for a defective detector covered by this Warranty, failure of delivery in whole or in part, or for any other cause. This Warranty and the writing to which it is attached constitutes the understanding of the buyer and seller so that no terms, conditions or agreements purporting to modify the terms hereof shall be binding unless made in writing and signed by an authorised agent of the home office of Protec Fire Detection (Export) Ltd.

WARNING!

INSTALLATION AND MAINTENANCE SHOULD ONLY BE PERFORMED BY PROTEC FIRE DETECTION (EXPORT) LIMITED OR BY THEIR AUTHORISED DISTRIBUTOR / REPRESENTATIVE FAMILIAR WITH THESE SYSTEMS.

Issue		Date	Author
1	First Issue	26/04/05	jlh
2	Minor Changes – Display Software v1.09	02/06/05	jlh
3.1	UL Information introduced	14/02/06	sb

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1.0 Introduction

This manual details the methods employed to install, commission and service the CirrusPro Series Aspirating Fire Detectors.

Background Background
It is known that particles smaller than the wavelength of visible light occur spontaneously as a material is overheated, and in numbers far above those present in a normal ambient environment. CirrusPro Detectors utilise the Wilson Cloud Chamber principle to detect the sub micron particles that are generated at the incipient, and all other stages of fire.

A filtered air sample is delivered to the detector via a centrifugal blower, a portion of which is diverted into a humidifier. At approximately 100% relative humidity, the sample is directed to the Cloud Chamber where, because of cooling, due to rapid vacuum expansion, water condenses onto the small particles and forms a ‘cloud’.

Consequently, the thermally generated particles cause many droplets to form into the cloud, which is then detected by the measuring system of the Cloud Chamber. The density of the cloud being proportional to the number of particles present.

The result is a continuous signal that corresponds to the particle concentration. This signal is used to provide a staged alarm sequence with four alarm levels.

The CirrusPro Detectors are self-supervised systems that continuously monitor for correct operation. Any problem is immediately reported with the front panel Fault LED, buzzer and the operation of a Fault relay.

CirrusPro Series Detectors locally store fault data, background particle concentration and event data. These can be accessed and plotted with optional Cirrus Windows Software.

An optional panel display can be fitted that allows configuration options and full data to be displayed. This can be mounted local to the detector or remote and networked to up to 32 devices (detectors or panel display).

1.1 Models and Equipment Covered

CirrusPro 100 Up to 100m of 25mm diameter sampling pipe. Single sampling pipe ‘inlet’ port.

CirrusPro 200 Up to 200m of 25mm diameter sampling pipe. Four, sampling pipe ‘inlet’ ports.

CirrusPro 200D As CirrusPro 200 with built in Display Panel (See CirrusPro RDP).

CirrusPro 200DSC As CirrusPro 200D but with four, scanned, sampling pipe ‘inlet’ ports.
CirrusPro 200+ (no display), 200D+ and 200DSC+ with larger ‘blower’ for longer pipe runs.

CirrusPro X4 As CirrusPro 200DSC with up to 40 sampling heads (not suitable for 25mm diameter sampling pipe).

CirrusPro RDP Remote Display Panel. Multifunction Quarter VGA back lit LCD and controls.

1.2 UL and ULC information. Pro100, 200, 200+, 200D, 200D+, 200DSC and 200DSC+

The following information is required to ensure the units compliance with the UL listing for UL 268 & CAN/ULC-S529-02

Detection Principle:	Cloud Chamber
Maximum Protected Area:	
Pro 100	10,000 square feet (929.03 square meters)
Pro 200	20000 square feet (1858.06 square meters)
Pro 200+	20000 square feet (1858.06 square meters)
Pro 200D	20000 square feet (1858.06 square meters)
Pro 200D+	20000 square feet (1858.06 square meters)
Pro 200DSC	20000 square feet (1858.06 square meters)
Pro 200DSC+	20000 square feet (1858.06 square meters)
Maximum Coverage Per Sample Head or Point:	30' x 30' (9.144m x 9.144m)
Number of Zones:	
Pro 100	1 Zone
Pro 200	1 Zone
Pro 200+	1 Zone
Pro 200D	1 Zone
Pro 200D+	1 Zone
Pro 200DSC	Field Programmable up to 4 Zones
Pro 200DSC+	Field Programmable up to 4 Zones
Maximum Number of Sampling Heads or Points:	100
Minimum Number of Sampling Heads or Points:	2 per pipe
Alarm Thresholds:	4 per Zone
Sampling System DT (Transport Time) Maximum Allowed	
Pro 100	120 Seconds
Pro 200	120 Seconds
Pro 200+	120 Seconds
Pro 200D	120 Seconds
Pro 200D+	120 Seconds
Pro 200DSC	1 Zone system 120 Seconds
	2 Zone system 90 Seconds
	3 Zone system 75 Seconds
	4 Zone system 60 Seconds
Pro 200DSC+	1 Zone system 120 Seconds
	2 Zone system 90 Seconds
	3 Zone system 75 Seconds
	4 Zone system 60 Seconds

Sampling System DT (Transport Time) Minimum Allowed:

6 Seconds (on Multi Zone systems)

Controls:	Push Buttons
Indicators:	Pre-Alarm, Fire 1, Fire 2, Fire 3 LED's Power and Fault LED's LCD display for Particle levels, Alarm and Fault Text
Power Requirements:	21-27V dc. Unit must be used with a UL 1481 Listed Power supply
Contact Ratings:	1A at 30V dc 4 Alarm relays per zone (Non-monitored volt free contacts) 1 Fault relay (Non-monitored volt free contact)
Outputs:	Audible alert, RS232 Serial Computer Interface
Inputs:	Programmable (Reset, Disable, Gain, Isolate, External Fault, Mains Fail, Battery Fault)
Data Retention:	200 events "Event Log", Historic Particle Graph
Water Requirements:	Distilled, replenished as required, dependent upon environment **Note:** Low ambient humidity(<50% R.H) or high ambient temperature (>30C) conditions will increase the water usage.
Unit Operating Temperature:	32-100° F (0-37.8° C) ambient
Relative Humidity:	0-95% non-condensing ambient
Cabinet:	
Pro 100	11.22" x 8.47" x 5.51" (285mm x 215mm x 140mm)
Pro 200	11.22" x 8.47" x 5.51" (285mm x 215mm x 140mm)
Pro 200+	11.22" x 8.47" x 5.51" (285mm x 215mm x 140mm)
Pro 200D	11.22" x 8.47" x 5.51" (285mm x 215mm x 140mm)
Pro 200D+	11.22" x 8.47" x 5.51" (285mm x 215mm x 140mm)
Pro 200DSC	17.32" x 15.15" x 5.51" (440mm x 385mm x 140mm)
Pro 200DSC+	17.32" x 15.15" x 5.51" (440mm x 385mm x 140mm)
Air Sampling System:	The piping diagram for each system will be supplied by Protec Fire Detection (Export) or an authorized representative. This diagram will indicate tubing size, as well as approximate lengths to each sampling point.
Gain Settings (Sensitivity):	1-10 (1 = Minimum, 5 = Intermediate, 10 = High) Note: If Fire 3 is set to a Gain of 1, Fire 3 Alarm Level shall not exceed 25%".

1.3 UL and ULC information Pro X4

The following information is required to ensure the units compliance with the UL listing for UL 268 & CAN/ULC-S529-02

Detection Principle:	Cloud Chamber
Maximum Intended Protected Area:	43,200 square feet (4013 square meters) 4 zones total 10800 square feet (1003.25 square meters) per zone 900 square feet (83.604 square meters) per sampling head or point
Maximum Coverage Per Sample Head or Point:	30' x 30' (9.144m x 9.144m)
Number of Zones:	Field Programmable up to 4 Zones
Maximum Number of Sampling Heads or Points:	48
Minimum Number of Sampling Heads or Points:	2 per Zone
Alarm Thresholds:	4 per Zone
Sampling Manifolds:	Minimum 2 per zone Maximum 12 per zone
Zone Manifold:	1 per Zone
Sampling System DT (Transport Time) Maximum Allowed:	
1 Zone System	120 Seconds
2 Zone System	90 Seconds
3 Zone System	75 Seconds
4 Zone System	60 Seconds
Sampling System DT (Transport Time) Minimum Allowed:	6 Seconds
Controls:	Push Buttons
Indicators:	Pre-Alarm, Fire 1, Fire 2, Fire 3 LED's Power and Fault LED's LCD display for Particle levels, Alarm and Fault Text
Power Requirements:	21-27V dc Unit must be used with a UL 1481 Listed Power supply
Contact Ratings:	1A at 30V dc 4 Alarm relays per zone (Non-monitored volt free contacts) 1 Fault relay (Non-monitored volt free contact)
Outputs:	Audible alert, RS232 serial computer Interface
Inputs:	Programmable

	(Reset, Disable, Gain, Isolate, External Fault, Mains Fail, Battery Fault)
Data Retention:	200 events “Event Log”, Historic Particle Graph
Water Requirements:	Distilled, replenished as required, dependent upon environment **Note:** Low ambient humidity (<50%R.H) or high ambient temperature (>30C) conditions will increase the water usage.
Unit Operating Temperature:	32-100° F (0-37.8° C) ambient
Relative Humidity:	0-95% non-condensing ambient
Cabinet:	17.32” x 15.15” x 5.51” (440mm x 385mm x 140mm)
Air Sampling System:	The piping diagram for each system will be supplied by Protec Fire Detection (Export) or an authorized representative. This diagram will indicate tubing size, as well as approximate lengths to each sampling point.
Gain Settings (Sensitivity):	1-10 (1 = Minimum, 5 = Intermediate, 10 = High)

Note: If Fire 3 is set to a Gain of 1, Fire 3 Alarm Level shall not exceed 25%".

2.0 Periodic Checks and Maintenance

The CirrusPro continuously adjusts its monitoring functions by means of feedback loops, ensuring a minimum of maintenance. To ensure continued proper operation, the system must be checked:

- Daily by the User.
- Every three months by Protec Fire Detection (Export) Ltd or an authorised representative.
- Whenever building alterations have been performed which could affect the system's operation.
- Whenever equipment within the protected area has been altered which could affect the system's operation.
- During a fault condition.
- After any alarm condition.

The following are based on average conditions. Because of the wide range of possibilities in various applications, the frequency of periodic checks and maintenance may have to be adjusted accordingly.

2.1 Periodic Checks

2.1.1 Daily Checks

The following must be performed **EVERY DAY** by the system User:

- Check system indicates a healthy condition.
- Any fault indicated should be recorded in the system logbook and investigated.
- Determine the extent of the fault and decide whether special actions (such as fire patrols) are needed.
- Check that any fault reported previously has been attended to.

2.1.2 Three-monthly Checks

The following must be performed **EVERY THREE MONTHS** by Protec Fire Detection (Export) Ltd or an authorised representative:

- Check the Event Log to determine any abnormalities.
- Refill the Water Bottle with distilled or de-ionised water.
- Check that all Tubing is properly connected, with no kinks.
- Check Inlet integrity.
- Check dc supply voltage level.
- Check Alarm and Gain levels as per specification.
- Check Vacuum level.
- Check the Sampling System airflow readings.
- Check Transport times at furthest Sampling point on each pipe.
- Check the LED current.
- Check and replace, where necessary, cloud chamber filters.
- Inspect and replace if necessary Vacuum Pump Bellows.

Caution: Do not neglect regular filter changes. Although a used filter may appear to pass the recommended flow, the dust it has trapped can cause an increase in the retention of sub micron fire particles, reducing system effectiveness.

2.1.3 Annual Checks

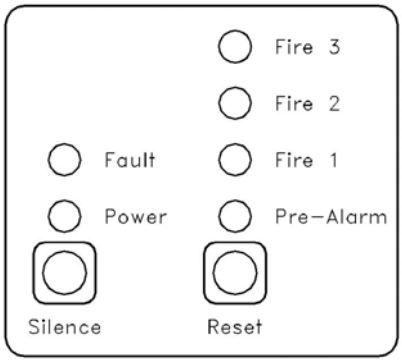
The following must be performed **EVERY TWELVE MONTHS** by Protec Fire Detection (Export) Ltd or an authorised representative:

- Carry out the three monthly checks as previously described.
- Inspect and clean if necessary the Flow Thermistors.
- Inspect and replace if necessary Vacuum Pump Bellows.
- Inspect and clean if necessary Cloud Chamber and Optics.

3. User Guide

3.1 Front Panel Indications and Controls

All CirrusPro models have a small control panel with 6 LED indicators and 2 push buttons:



Indications
There are 4 levels of alarm, Pre Alarm and Fire levels 1, 2 and 3. The points at which these levels are set can be examined in the Sensitivity Settings section of the commissioning menu on the PC.

Power indicator is On when the power is present but flashes when a remote power supply fault is detected. If the power indicator is off there is no power to the unit.

Controls

Silence - Releases the activated alarm relays and / or mutes the internal buzzer.
Reset - Performs the Silence function and clears any current fire conditions.

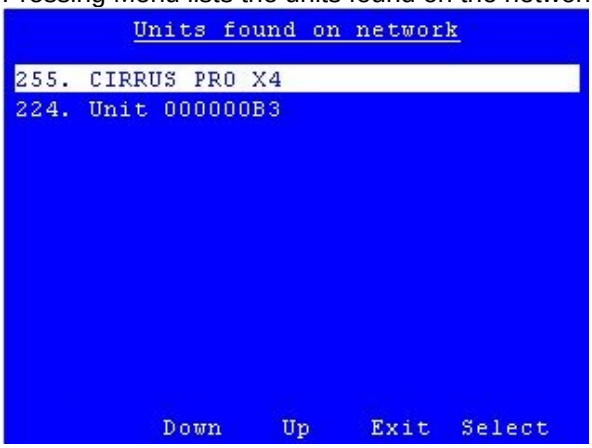
3.2 Panel Display

On powering up the display will show the number of units found on the network.

The text at the bottom of the display corresponds to the push buttons below the display. By holding down a button, its function will auto-repeat.

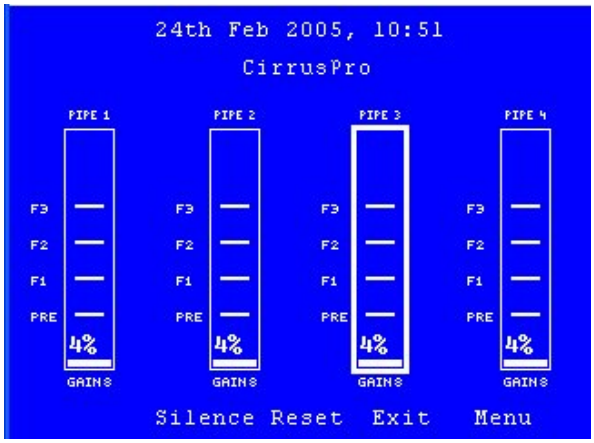
Mute is used to mute the system buzzer.

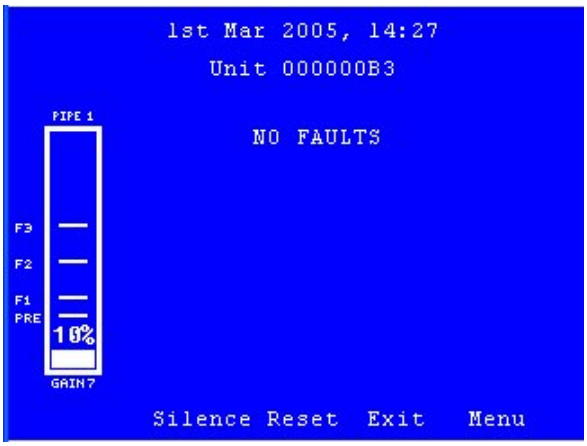
Pressing Menu lists the units found on the network.



The **Up** and **Down** keys move between the units.

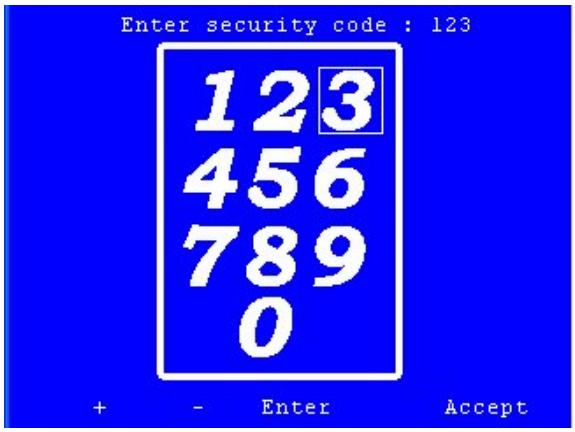
Select accepts the current highlighted detector unit, request status and displays the following, depending on model:





Showing the current particle levels for the sample pipes.

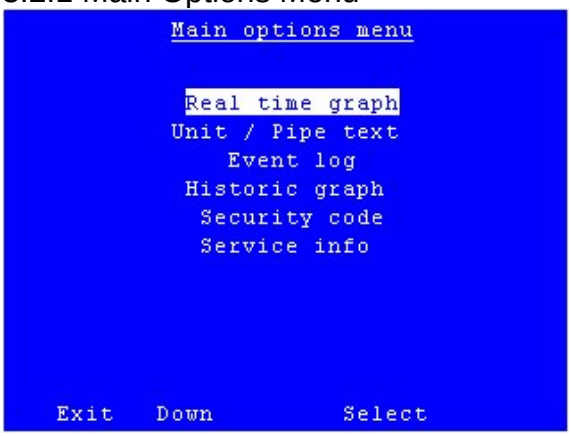
Pressing **Menu** requires a password.



Use the **+** and **–** to select the number and press **Enter**. The low security codes is factory pre set to 112233, although, this can be changed from the display see section 3.2.6.

When all the digits have been entered press **Accept**.

3.2.1 Main Options Menu



The menu options available are as shown.

Use the **Down** Key to move to the required option.
Press **Select** to move to that menu Option.

Pressing **Exit** from this menu will revert back to the particle level display. It will then be necessary to enter the security code again to return to the Main Options Menu.

General rules:

Up and **Down** – Move through the various options available on the menus.

Select – Changes highlighted value or moves to a further menu

+ and **–** – Increase and decrease the highlighted value

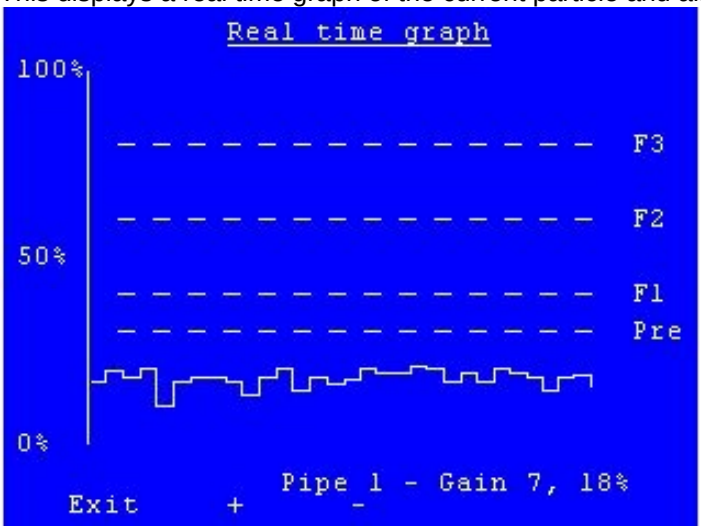
Accept – Stores changes in the detector unit (when necessary). Some changes require the unit to be reset before being fully implemented.

Exit – Leaves the current menu. Note that some changes remain indicated locally. These are not sent to the detector unit until accept is pressed.

Buttons will auto-repeat after being held down for a short time.

3.2.2 Real Time graph

This displays a real time graph of the current particle and alarm levels showing about 5 minutes.

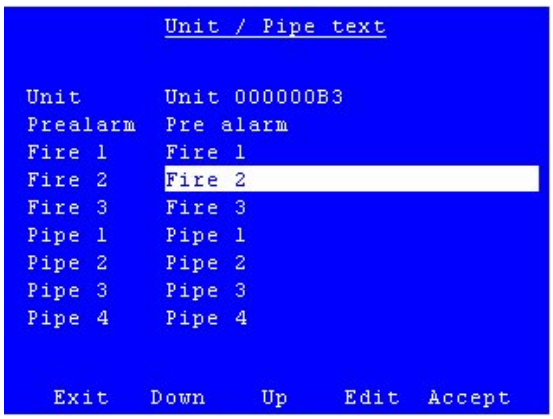


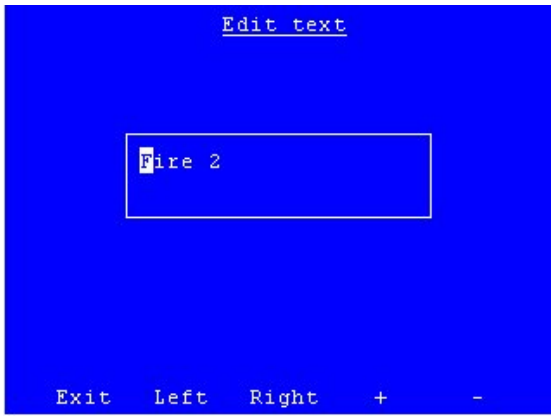
Use **+** and **–** to view other Pipes (where available).

3.2.3 Unit/pipe text

The display receives the text from the unit.

Use **Up**, **Down** and **Edit** to select the text to be edited.





Then use **Left**, **Right** and **Exit** keys to select a character.

To change a character, use **+** and **–** to scroll through the symbols and alphabet in the following order:

!"£$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]_'abcdefghijklmnopqrstuvwxyz

After editing as required, press **Exit** to return to the Unit / Pipe Text display.

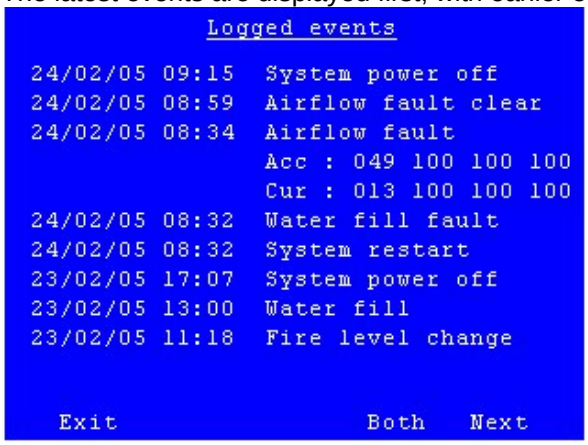
Press **Accept**, when all the text has been modified, to send the text to the Unit.

Pressing **Exit** leaves the menu with the text unchanged (even after editting) if Accept has not been pressed.

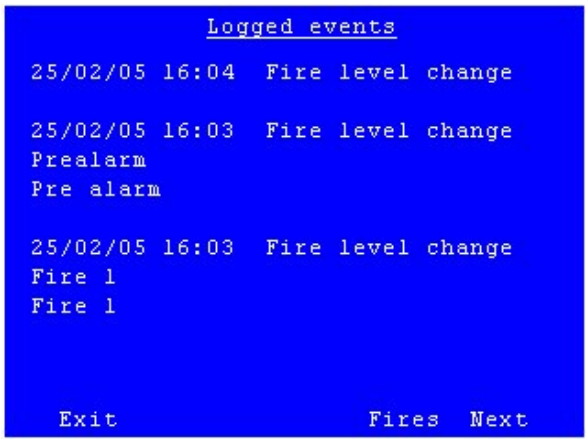
3.2.4 Event Log

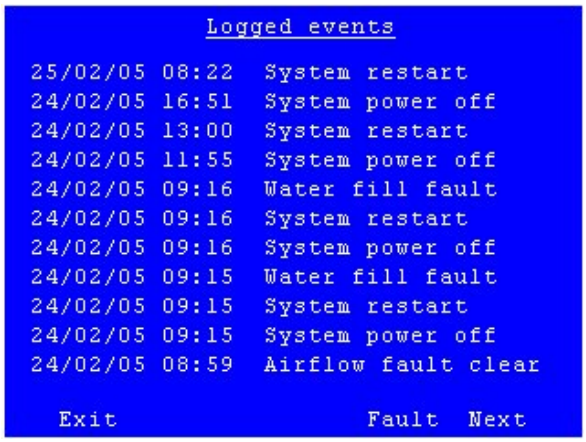
The Event Log stores the last 128 events on the unit.

The latest events are displayed first, with earlier events displayed by pressing Next.



Pressing 'Both' changes the display to show just Fire events.

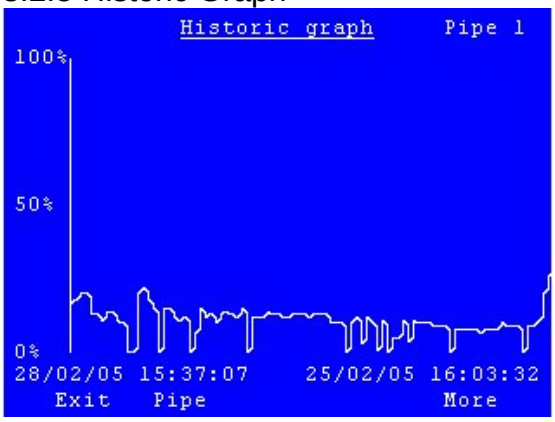




Pressing **Fires** changes the display to show just Fault events.

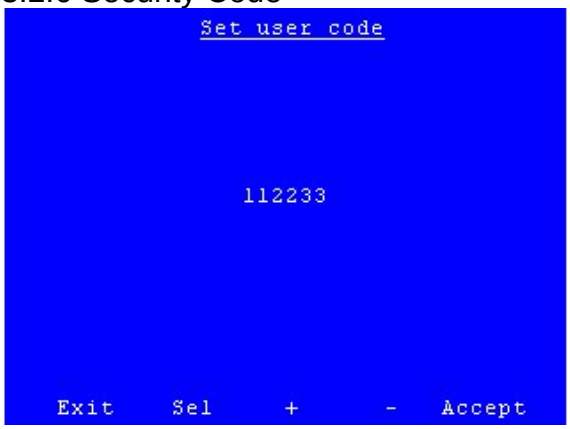
Pressing **Fault** returns to showing all events.

3.2.5 Historic Graph



The Historic Graph shows a period of about three days, with about 10 days stored. The amount of data is dependent on what has happened during the recording period. The amount of data stored increases during fire and pre alarm events.

3.2.6 Security Code



On opening this screen, the display shows 0. Use **+** and **–** to increase or decrease the value and Select (**Sel**) to add another digit. Use no more than 9 digits and the first digit cannot be 0.

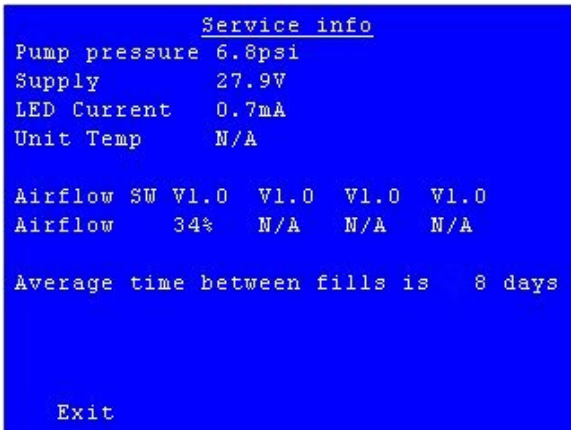
When the required code is displayed press **Accept** to immediately update the unit. It is very important to log this code as it cannot be extracted from the unit.

Pressing **Exit** leaves this display without changing the code.

Record the User Security code here:

User Code

3.2.7 Service Information



Acceptable Values:

Pump Pressure	-	> 5.7 psi
Supply voltage	-	19V to 30V
LED current is	-	0.26mA to 5.67mA
Airflow	-	Refer to Pipe Calculation

Average time between fills - Usually 4 to 6 days, depends on local conditions.

4.0 Fault Finding

Internal diagnostics monitor for faults that may normal running.

4.1 Fault List

The list below shows all the possible faults and their codes:

1 Processor fault
2 Corrupt eeprom
3 Supply fault
4 No water
5 Chamber seal
6 Vacuum fault
7 LED fault
8 Water fill fault
9 Airflow fault
10 Stack overflow
11 Unit isolated
12 Low supply voltage
13 Algotec fault
14 Unit cold Fault
15 Unit disabled
16 Expansion board fault
17 External fault
18 Battery Fault
19 Mains Fault
20 Sample blocked
21 Purge blocked
22 Zone Override Enabled

The numbers correspond to the Fault Codes, which can be extracted as described below.

4.2 Indicating Fault Codes on the Detector Unit

The CirrusPro can pulse the Fault LED to indicate fault code of current Faults or the last fault if there are no current Faults.

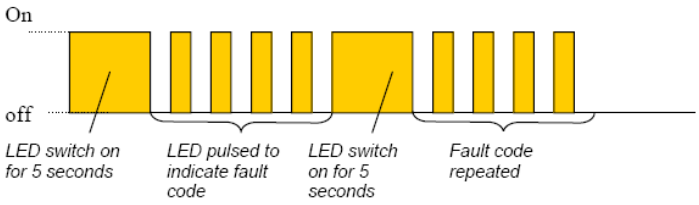
When the unit is in Fault, press and **hold** the Silence button.

The Fault LED will illuminate for 5 seconds, then pulse a number of times indicating the fault code.

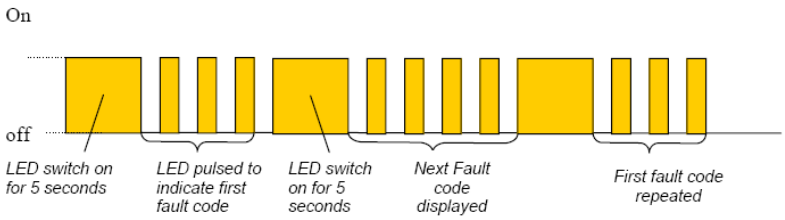
When the code is complete, the Fault LED will illuminate for 5 seconds.

The code will repeat or further fault codes will be indicated.

Faults are indicated in numeric order i.e. Code 3 before Code 4 etc.



Fault LED indicating one fault (fault code 4 – No water).



Fault LED indicating two fault codes (fault codes 3 & 4).

The sequence will repeat until the Silence Button is released.

5.0 Detector Specification

Physical Data varies with model and are not given here

Supply Voltage:	19 - 30VDC
Humidity:	10 - 95%RH, non-condensing
Temperature:	0 - 38°C
IP Rating:	IP30
Cable Access:	20mm knock
Cable Termination:	Screw terminal blocks (0.2 - 2.5mm2, 30 - 12AWG)
Pipe ID:	19 to 25mm (preferred OD 25mm)
Alarm Indications:	Pre-alarm, Fire 1, Fire 2, Fire 3.
Other Indications:	Supply Healthy, General Fault.
Sensitivity Range:	20,000 particles per cc to 3 million particles per cc
Sensitivity ranges:	10 programmable.
Programmable Inputs:	4 monitored inputs for Isolate, Silence, reset and ‘Sensitivity Change’ feature. Open circuit voltage: ~16V, Max applied voltage: 30V Max closed circuit resistance: 1500 Ohms
Output Relays:	4 Programmable Fire Relays 1 Fault Relay 4 Additional / Pipe on the expansion board for sampling systems All Rated: 0.3 A at 125 VAC; 1 A at 30 VDC Rated carry current 1 A Max. switching voltage 125 VAC, 60 VDC Max. switching current 1 A
Auxiliary (VS) supply:	27.6V, Current limited to 300mA
Power fault input:	Fault level < 2.5V
Event Log:	128 events stored on FIFO basis
Data Retention:	10 day historical graph.
Sensitivity Settings:	7 day programmable settings with 3 time zones per day.
AlgoTec	Environmental learning, interactive decision making algorithm software to continuously monitor background particles levels and enable optimum detector sensitivity and alarm thresholds.
Airflow Monitoring:	‘High Airflow’ and ‘Low Airflow’ fault monitoring.

Cirrus Pro Series Aspirating Fire Detectors Worldwide Manufacturer

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