Installation, Commissioning and Maintenance Manual

Issue 1

Revision History

Revision	Description	Author	Approved	Date
1	Document Creation	CM, TW & RB	AW, JL, NH	16/11/2023

This document must be read in accordance with the Product Documentation Disclaimer available at www.protec.co.uk/terms.

This equipment has been primarily designed to sense the solid, sub-micron particles generally emitted in the incipient and early stages of combustion.

The equipment has been tested and certified to relevant international and national standards, directives, and regulations.

The use of the equipment outside the tests defined in these standards, directives and regulations is entirely at the owner's risk, no warranty of operation is given or implied by Protec Fire Detection PLC or its agents.

Trademarks

Algo-Tec® is a registered trademark of Protec Fire Detection PLC in the United Kingdom.

Megger® is a registered trademark of Megger Instruments Limited in the United Kingdom, European Union, and other countries.

Pozidriv® is a registered trademark of Trifast PLC in the United Kingdom.

Protec® is a registered trademark of Protec Fire Detection PLC in the United Kingdom.

Protec is a registered trademark of Protec Fire Detection PLC in the European Union.

This equipment has been manufactured in conformance with the requirements of all applicable UK directives and regulations.

This equipment has been manufactured in conformance with the requirements of all applicable EU council directives and regulations.

Electrical or electronic devices that are no longer serviceable must be collected separately and sent for environmentally compatible recycling (in accordance with the European Waste Electrical and Electronic Equipment Directive). To dispose of old electrical or electronic devices, you should use the return and collection systems put in place in the country concerned.

For your safety

Warning! Any terminal covers, protective covers or shrouds removed during installation or maintenance should be refitted to protect from damage or injury.

Notice! Take care when handling the product and its component parts. Some parts may have sharp edges or corners.

Notice! This equipment and its associated connections must be installed, commissioned and maintained by a suitably trained skilled and competent person.

Notice! This equipment is not guaranteed unless installed and commissioned in accordance with current national standards.

Notice! Aspects of the system design may be governed by local regulation, in which case, the regulation shall take precedence over the recommendations given in this manual.

Notice! Due to the wide variation in installation conditions, mounting hardware is not supplied with the panel. Use fixing devices suitable for the mounting surface and mounting style of your installation.

Notice! Wiring should be completed in accordance with local wiring regulations and the local fire alarm design and installation standard. The correct cable separation and cable segregation methods must be used in accordance with local wiring regulations.

Notice! It is assumed that the commissioning engineer has read the User Manual and is therefore familiar with the basic operation of the system.

Notice! Clean the touch screen and surfaces with a slightly damp soft cloth only. Do not use any cleaning agents and make sure that no liquid enters the inside of the device.

Notice! Do not use any pointed or sharp objects (e.g. screw drivers, pens, etc.) when operating the touch-sensitive display.

Notice! This product contains exposed sensitive components. Ensure the inside of its enclosure is kept clean from any debris, swarf, dust, tools or building materials.

Notice! This product and any of its associated devices, must not be connected to any cable undergoing insulation resistance testing. Any external cabling must be completely discharged before connection to this product.

Notice! Any external connections into this product must be made using cable glands, or similar, suitable to maintain the products stated Ingress Protection (IP) rating.

Notice! This product must not be installed in an area that is subject to a corrosive atmosphere, excessive moisture or may allow water or other liquids to come into contact with its external connections.

Notice! This product must be installed in the correct orientation and location as specified in the installation manual.

Notice! This product must be sited in a readily accessible location that facilitates safe maintenance work.

Notice! Take care to tighten fasteners to the correct torque, as indicated in the products installation manual.

Notice! Anti-static handling precautions must be taken when carrying out any internal maintenance work to prevent damage to the product. Ensure a suitable anti-static wrist-strap is worn and is correctly bonded to the internal earth point before working inside the product.

Table of Contents

1 Scope of Document

This document refers to the Cirrus CCD aspirating fire detection systems. The manual details the user information and installation methods for the Cirrus CCD with specific attention to the installation, commissioning, and servicing of the product.

Applicable Standard and Directive Information

The Protec Cirrus CCD aspirating fire and smoke detector is designed to meet the requirements of the following international codes and standards including the relevant European directives.

European Codes and Standards

Standard Name and Details	Description
The FIA Code of Practice for the Design, Installation, Commissioning & Maintenance of Aspirating Smoke Detector (ASD) Systems [2012]	Recommendations for planning, design, installation, commission, and maintenance of aspirating smoke detection systems.
Standard: BS EN54-20:2006 Part 20: Aspirating smoke detector	The standard specifies the performance criteria for aspirating smoke detectors used in the fire detection and fire alarm industry.
Standard: BS EN54-17:2005 Part 17: Short-circuit isolators	This standard specifies the requirements, test methods and performance criteria for short circuits isolators for use in fire detection systems.
BS EN 60068 (relevant parts)	Environmental Testing.
BS EN 61000 (relevant parts)	Electromagnetic Compatibility.
BS EN 62368 -1:2014	Electrical Safety.

European Directives

Directive Name and Details	Description
Low Voltage Directive (Directive 2006/95/EC)	Safe Working Voltage Directive.
EMC Directive (Directive 2014/30/EU)	Electromagnetic Compatibility.
RoHS Directive (Directive 2011/65/EU)	Restriction of the use of certain Hazardous Substances.
WEEE Directive (Directive 2012/19/EU)	Electrical and Electronic Equipment Recycling Directive.

2 Introduction and Key Features

The Protec Cirrus Cloud Chamber Detector [CCD] incorporates 'Cloud Chamber' fire detection, continually receiving air samples throughout the aspirating pipe system. The airflow of the pipe system is monitored at each inlet port, up to four. The sensor reports any changes in airflow that could proportionally affect the fire monitoring system.

Fire detection – The Cloud Chamber detector identifies invisible sub-micron particles generated during the combustion process when an over-heat condition occurs. The cloud chamber measurement scale is in particles per cm^3 ($PPCM^3$) and provides the 'Fire' detection element of the Cirrus CCD detector.

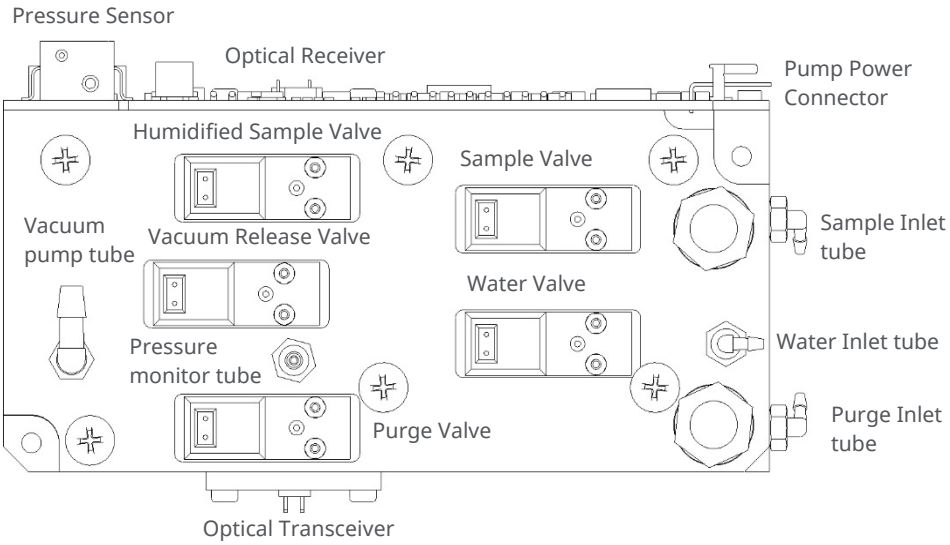


Figure 2.1 Cirrus CCD Cloud Chamber Assembly

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. The Cirrus CCD utilises the Wilson Cloud Chamber principle to detect the sub-micron particles that are generated at the incipient, and all other stages of a fire.

A filtered air sample is delivered to the detector via a centrifugal blower, a portion of which is diverted into a humidifier. At 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. Consequently, the condensation around each particulate increases the overall size, forming a 'cloud'. The cloud can then be 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 Cirrus CCD is a self-supervised system that continuously monitors for correct operation. Any problem is immediately reported at the detector display, buzzer and by operation of a fault relay.

The above diagram shows the physical details of the Cirrus Cloud Chamber for reference throughout this manual.

Alarm Level Scale – The Cirrus CCD detector converts the particle [PPCM^3] readings generated from the cloud chamber into a bespoke scale for the purpose of ease when assigning the alarm thresholds.

The features of the Protec Cirrus CCD Aspirating Smoke Detector are:

- Incipient fire detection via Cloud Chamber Detector technology
- PreAlarm, Fire 1, Fire 2, and Fire 3 programmable alarm points
- Up to four individually monitored detection areas
- Protec addressable protocol
- On-board short circuit isolator
- Common Fault output contact
- 5 Programmable output contacts
- 3 Programmable inputs
- Airflow monitoring per inlet pipe channel
- Variable blower speed control
- 7” Full colour multi-function touch screen LCD display for ease of setup and fault reporting
- Commissioning menu access code protected
- Remote network via RS485 and TCP/IP
- 6 TCP/IP camera connectivity

3 Glossary of Terms

Aspirating Smoke Detector (ASD) – A smoke detection device that consists of various components, including sensor technology for the detection of particles of combustion, by continuously sampling air drawn into the device typically by the use of a fan. The air is drawn through a pipe network from the protected area.

BMS – A building management system is a computer-based control system installed in buildings that controls and monitors the building's mechanical and electrical equipment such as ventilation, lighting, power systems, fire systems, and security systems.

CIE - Control and indicating equipment is equipment for receiving, processing, controlling, indicating, and initiating the onward transmission of information as used in fire alarm systems.

Cumulative Effect – Occurs when smoke particulates are drawn into multiple sampling holes of the same pipe.

Dilution Effect – The mixture of ‘smoke concentrated’ air drawn from multiple sampling holes with clean (no smoke) air drawn from the other sampling holes in the same sampling pipe connected to the ASD.

End Test Point – A normally closed pipe orifice installed at convenient locations used for servicing and maintenance of the ASD typically at the end of the sampling pipe network.

Maximum Transport Time – The maximum allowable time it takes for the sampled air to travel from the furthest sampling hole to the ASD.

Sampling Hole – An open point in the sampling pipe network that draws air from the protected area into the sampling pipe and onto the ASD.

Sampling Pipe – The pipe containing the flow of air from the protected area to the ASD.

Transport Time – The time it takes for the sampled air to travel from the sampling hole to the ASD and for the ASD to respond.

4 EN54-20 Classification

European Standard EN 54-20, which specifies the requirements, test methods, and performance criteria for aspirating smoke detector for use in buildings. All Cirrus HYBRID aspirating fire and smoke detectors are fully compliant with EN54-20. Detector sensitivity is determined by the following class criteria as defined by The FIA Code of Practice for the Design, Installation, Commissioning & Maintenance of Aspirating Smoke Detector (ASD) Systems [2012].

Class A: Very High Sensitivity

An ASD system with very high sensitivity that can provide very early warning of a potential fire condition. Such systems are particularly relevant for high-risk areas where staged responses to the multistage alarm conditions are justified to ensure minimum down time of the protected area that may result from any fire related incident.

Class B: Enhanced Sensitivity

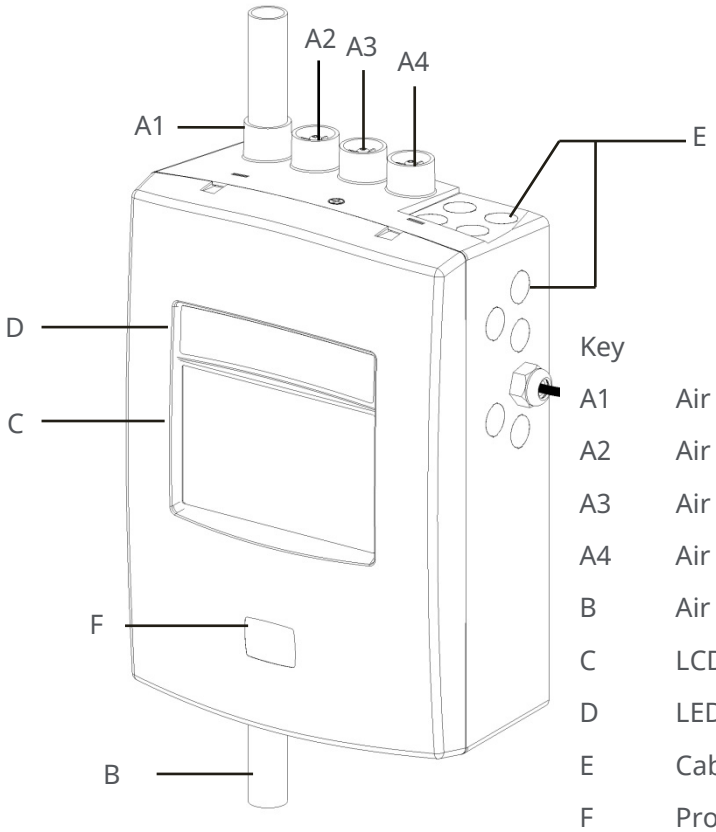
An ASD system with enhanced sensitivity, for applications where an additional degree of confidence is required for the protection of a particular risk. The enhanced capability of such systems is often required to compensate for other risk factors in the protected area such as unusually high ceilings or significant air flows.

Class C: Normal Sensitivity

An ASD system designed to give equivalent performance to standard point detection systems meeting the requirements of EN 54-7.

5 Component Overview

5.1 External Component Overview



Key	
A1	Air Inlet – Pipe 1
A2	Air Inlet – Pipe 2
A3	Air Inlet – Pipe 3
A4	Air Inlet – Pipe 4
B	Air Exhaust/Return
C	LCD Touch Display
D	LED Status Indication
E	Cable Entry Knock Outs
F	Product Manufacturer Label

Figure 5.1 Cirrus CCD External Components

5.1.1 LED Status Indication

Key	
A	Supply Healthy
B	Fault
C	PreAlarm
D	Fire 1 to 3

Figure 5.1.1 Cirrus CCD LED Status Indication

5.2 Internal Component Overview

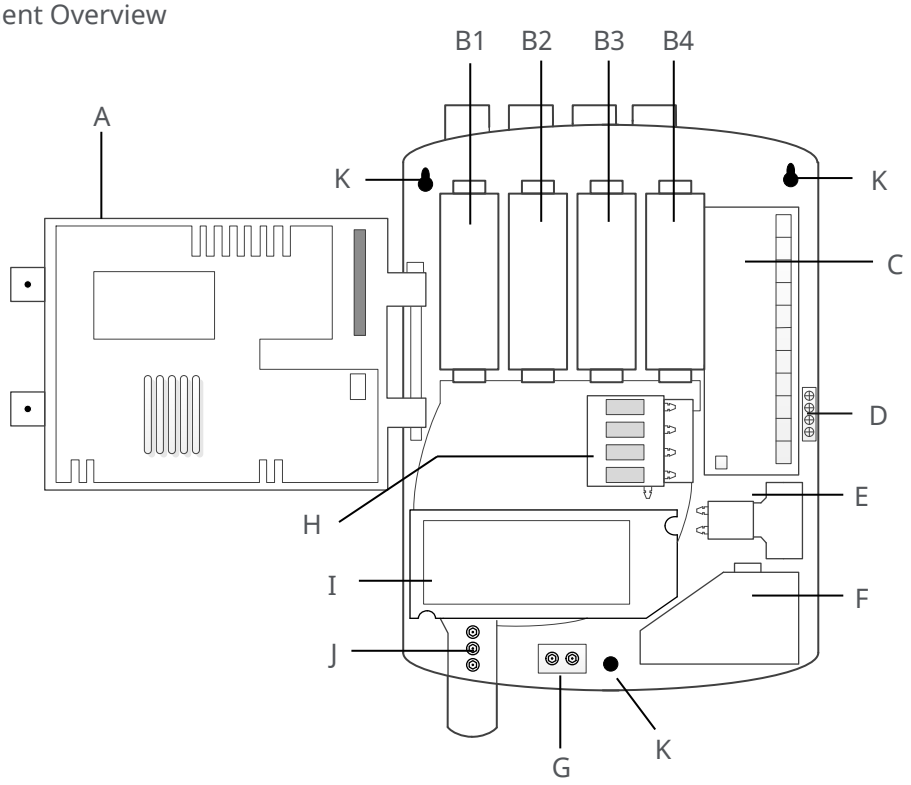
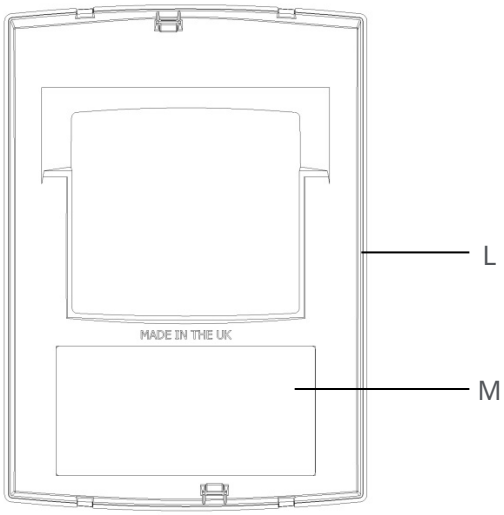


Figure 5.2 Cirrus CCD Internal Components

Front cover rear view



Key	
A	Front Display Assembly
B1	AFS Location 1
B2	AFS Location 2
B3	AFS Location 3
B4	AFS Location 4
C	Terminal Connection Board
D	Continuity Block
E	Vacuum Pump Assembly
F	Distilled Water Bottle
G	Vacuum Silencer
H	Pipe Scanning Module (Scanning Model only)
I	Cloud Chamber Assembly
J	Sample Inlet, Purge & Vacuum Outlet
K	Unit Wall Fixing Points
L	Front Door (Rear View)
M	Label: Wiring Diagram

(1) Scanning module fitted on models with more than 1 inlet pipe fitted.

5.2.1 Front Door Assembly Component Overview

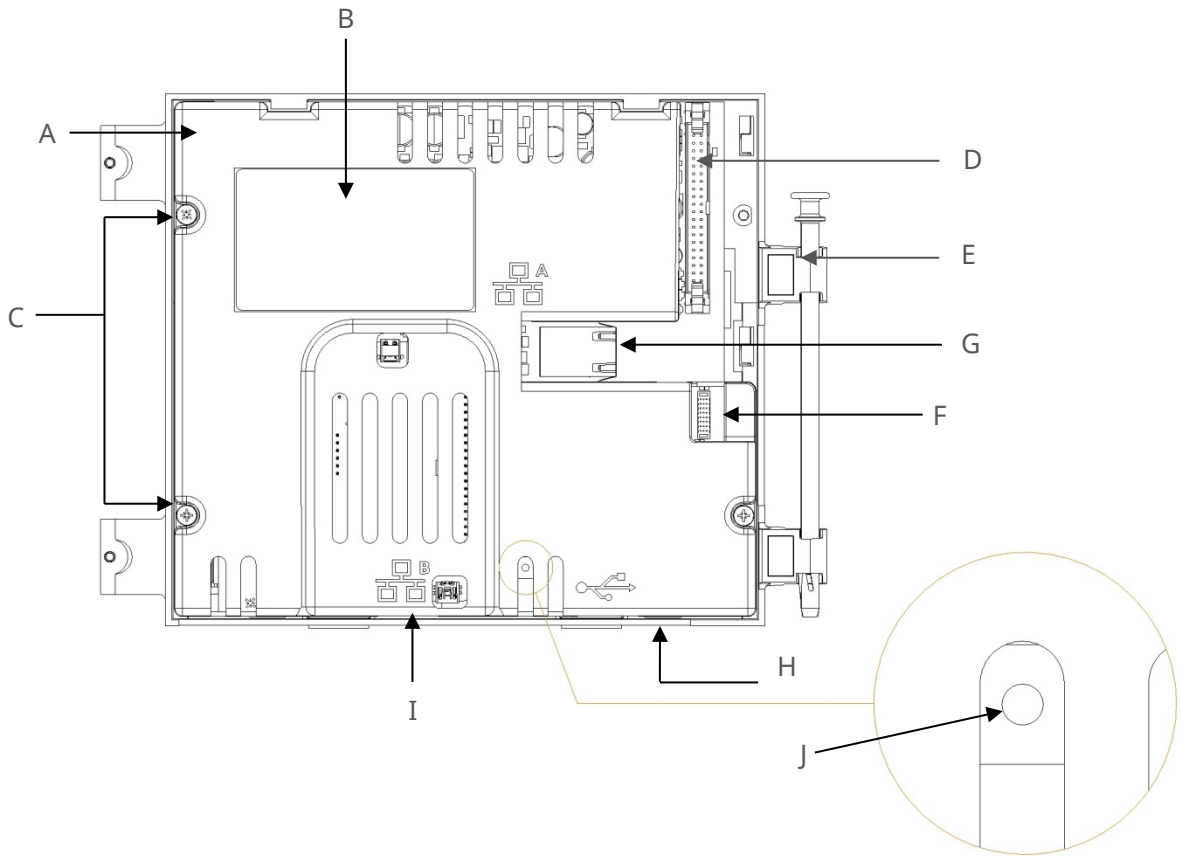


Figure 5.2.1 Cirrus CCD Front Door Assembly Components

Key

A	Rear Display Cover Moulding
B	Label: AFS Position
C	Front Display Assembly Securing Screws
D	Data Ribbon Cable to Terminal Board
E	Hinge Pin
F	Ribbon Cable to Cloud Chamber and Pipe Scanning Unit
G	Ethernet Connection TCP/IP (RJ45)
H	USB_B Computer Connection
I	Camera Connection (RJ45)
J	Touch Display Calibration Reset Button

6 Installation

6.1 Remove Packaging

Remove all external packaging from the CCD detector. Remove and retain any bungs from the spares kit for future use.

6.2 Removing the Front Cover

In order to remove the front cover, follow the steps and use Fig 6.2 as a reference.

1. Unscrew and remove the top and bottom screws using a Pozidriv® screwdriver.
2. Carefully unlock the snap-in clips using a flat driver tool to push the top & bottom clips and pull away the front cover in a continuous action.

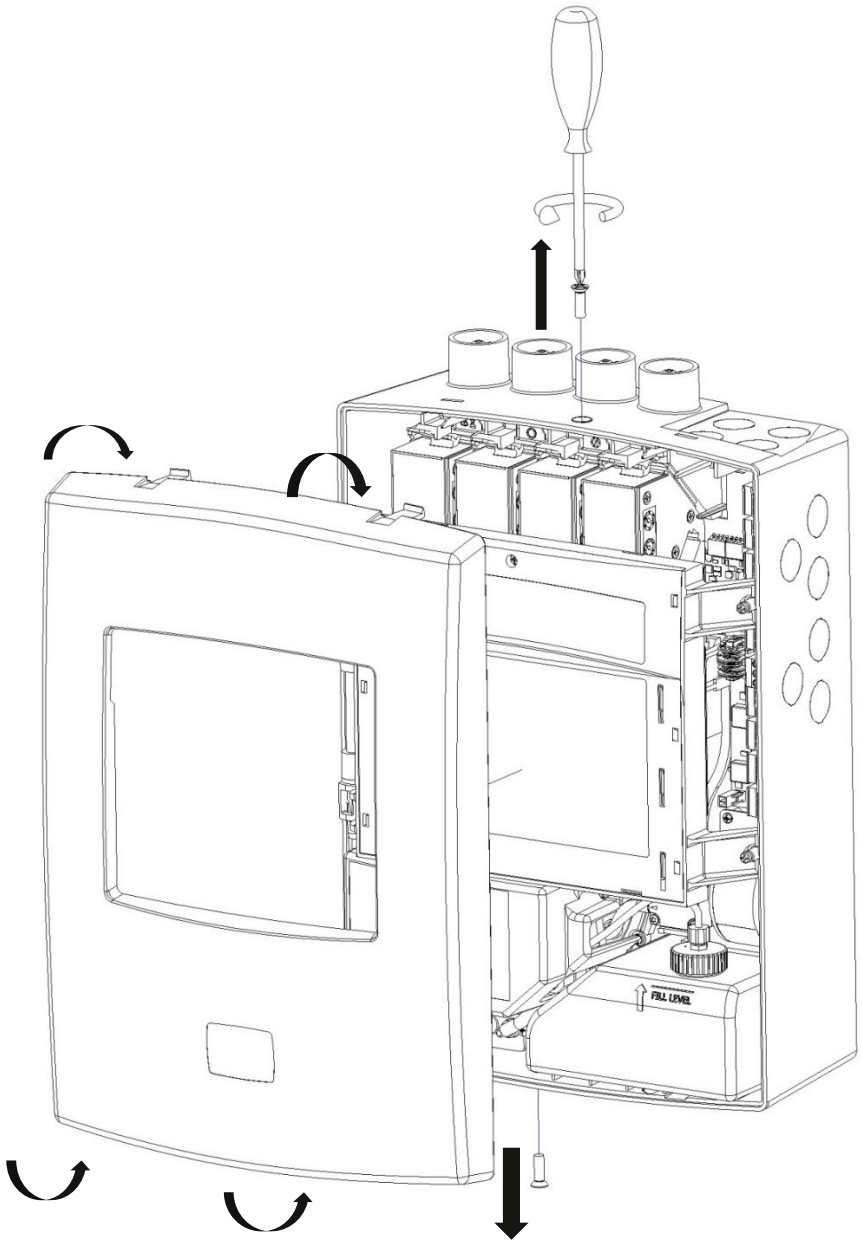


Figure 6.2 Opening the Cirrus CCD

6.3 Accessing the Terminal Connections

The display moulding is attached via a hinge and two securing screws. To release the door, unscrew the two captive screws. The terminal connections are behind the display moulding.

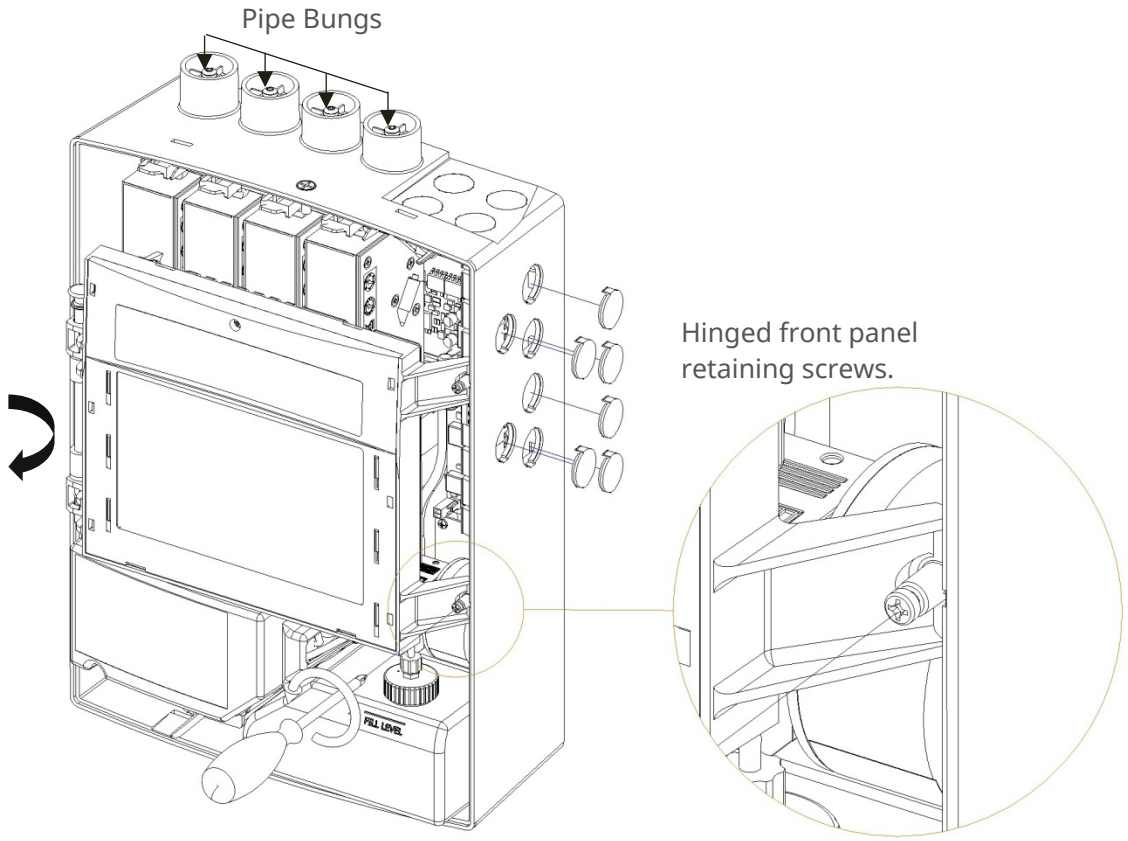


Figure 6.3 Assessing the terminal connections.

Although care has been taken to cover the bare components it is important to protect the components from static discharge and mechanical damage.

6.4 Gland Point Knock Outs

The Cirrus CCD has ten cable glanding points, four on the top right and six on the right-hand side. To remove the required cable glanding point gently push the plastic from the inside of the enclosure. Remove the required knock-out to suit the necessary installation connections.

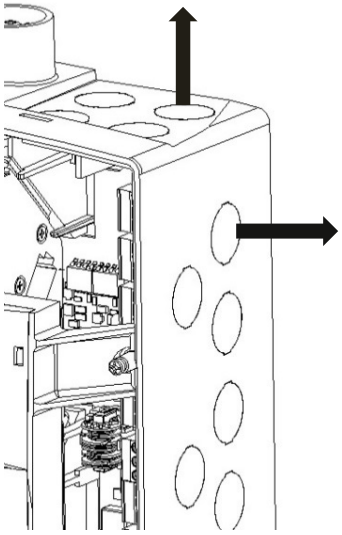


Figure 6.4 Removing the gland point knock outs.

6.5 Mounting Dimensions

Utilise the three fixing points to secure the detector to a stable base. Solid, non-hollow walls are better suited to provide strength and lower reverberation. All measurements in mm (inches). Not to scale.

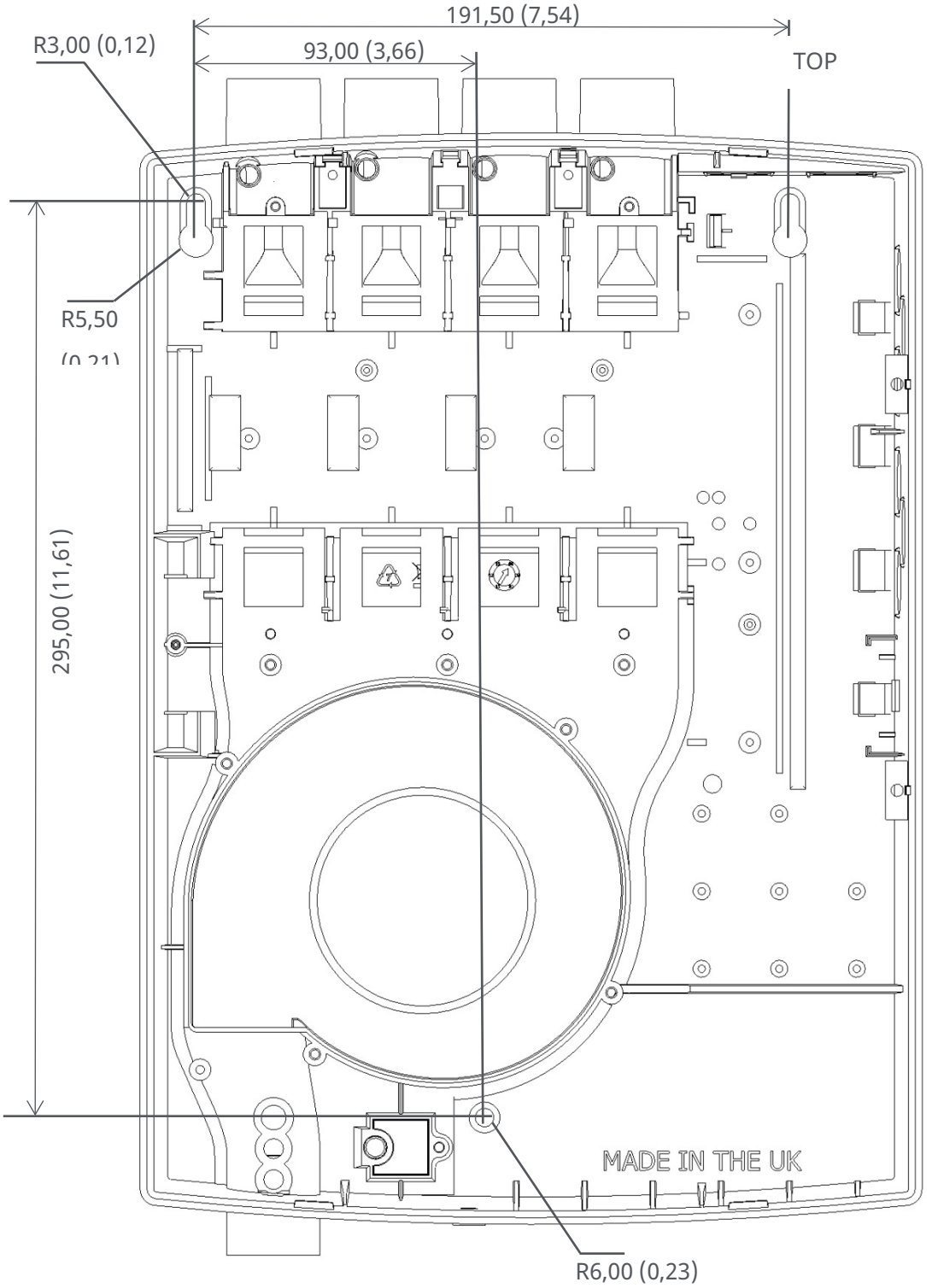


Figure 6.5 Cirrus CCD drill template

6.6 Fixing to the Wall

Do not remove any pipe work ‘bungs’ (consult Figure 6.3) until ready to fit the pipes.

The detector is to be mounted to the vertical wall surface (90° from a level floor), in the correct orientation.

1. Mark the mounting surface with the three mounting points using the mounting dimensions or the detector as reference. Do not drill with the detector in situ.

2. Remove the detector from the drilling area, drill and plug the mounting points.

3. Mount the detector on the wall using the three mounting holes. Ensure detector is level on all planes using a spirit level.

4. Ensure no dust or debris is present within the detector.

5. Identify the following terminal connections and cables:
   - Power supply connection
   - Protec Loop protocol communication connection
   - Input & output connections
   - RS485 Network connection (if required)

6. Fit all required wiring glands. Note the position of the relevant terminal blocks (i.e., power supply, input & output terminal blocks) to ensure sufficient tail length to enable ease of connection.

7. Ensure the detector is wired correctly for the power and inputs/outputs required for operation. Do not connect any power at this time.

8. Do not over tighten the terminal blocks.

9. Remove the blanking plugs from the used pipe inlets, ensure all pipes are fully inserted into the assembly. Ensure any unused pipes are blocked with the blanking plugs provided.

10. Ensure any unused pipes are blocked with the blanking plugs provided.

The detector is now ready to be commissioned.

7 General Cabling Requirements

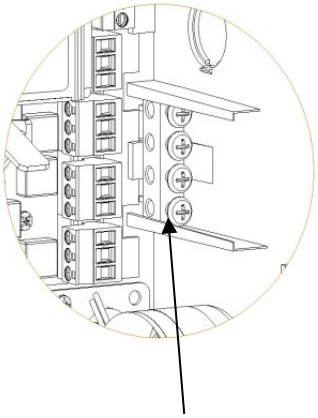
All wiring associated with the system must conform to the current wiring regulations, and cabling must conform to the relevant National Standards Specifications. Recommended cable separation for electromagnetic compatibility in buildings must be followed.

Where screened cables are used it is important to ensure that screen continuity is maintained between cable segments. Any screen wiring in the detector enclosure must be sleeved and securely bonded to the continuity block.

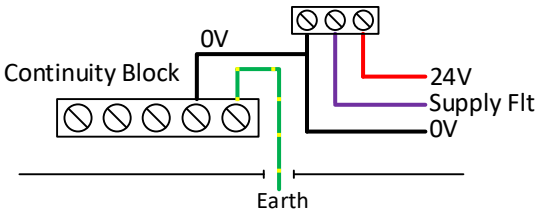
All connections to third party equipment must be installed to the relevant manufacturer's instructions.

Terminate the 24 V power supply and all other connections used.

It is recommended the 0 V of the 24 V power supply unit is connected to the nearest Earth point using the continuity block.



Continuity Block

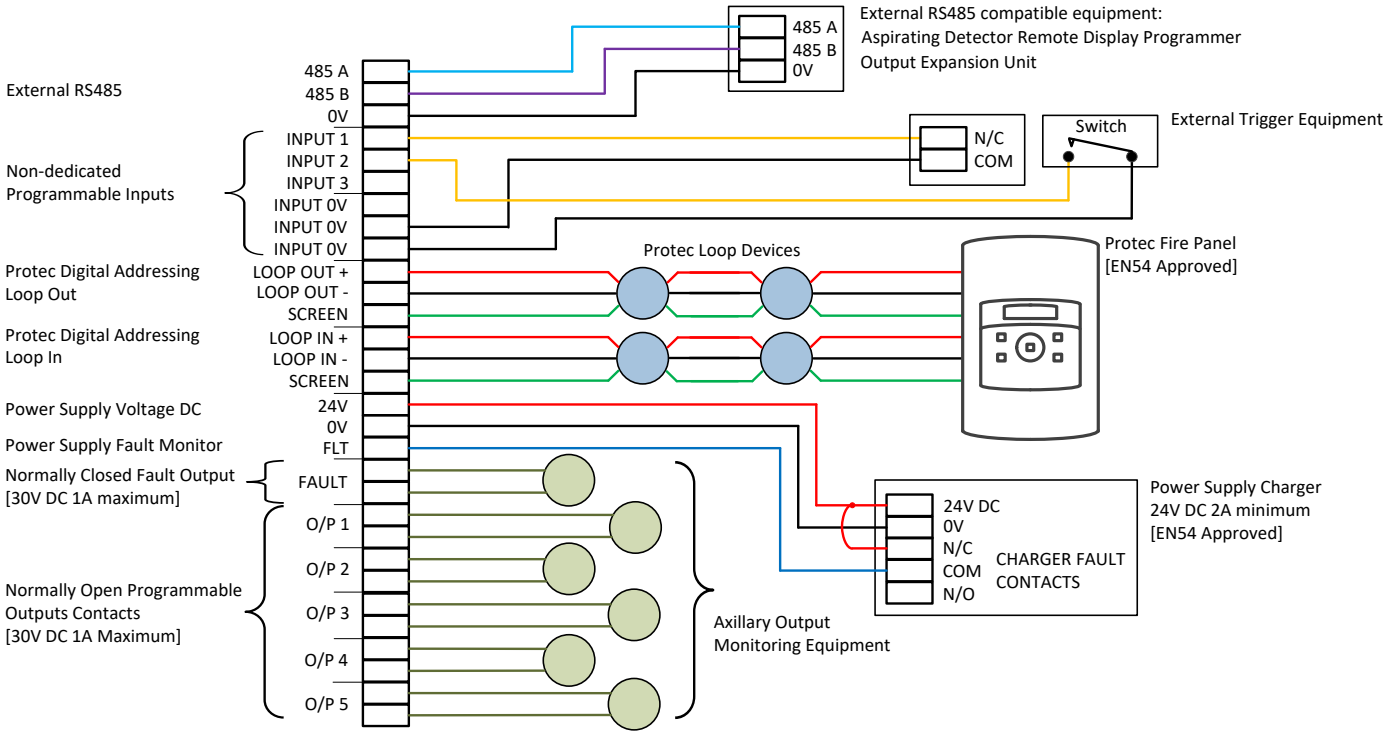


- Ensure the 24 V dc power supply is the correct polarity and suitably protected at the power source.
- Terminate the detector 24 V dc power supply and any other electrical connections into the removeable cable terminal blocks.
- Always ensure the aspirating detector is suitably grounded (as detailed above).
- Where necessary; connect the Ethernet cable to the desired RJ45 port, either Port A or B dependent upon application.
- Do not insert the power terminal connector at this point.

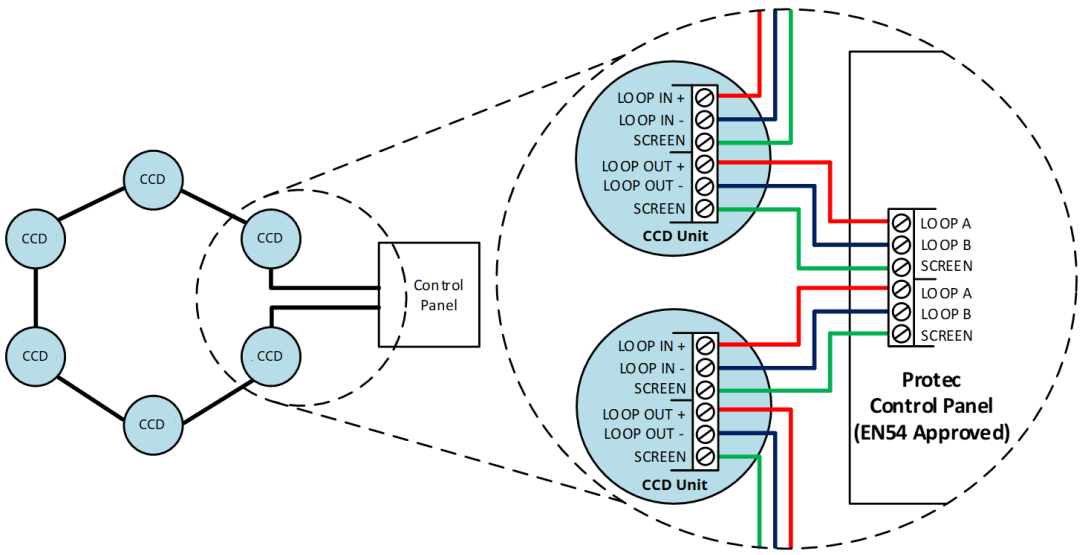
7.1 Wiring Diagram

Description of each Cirrus CCD terminal connections with typical connected device(s).

7.2 Protec Digital Addressing Loop Wiring



Requirements for wiring the Protec digital address loop, wired as a ring or loop.



Loop Screens must be isolated from all additional cable screen connections to preserve BS EN 61000 EMC compliance. All additional screens are to utilise the continuity block available.

8 Start Guide to Commissioning Detector

Ensure all pipe configurations are clear of debris before final connection.

Ensure all sampling pipe configurations have been installed before supplying power to the Cirrus CCD detector.

8.1 Preparing the Water Bottle

- Locate the water bottle cap fitted with the feed line.
- Remove the transit cap from the bottle and discard, replace with the cap fitted with the feed line.
- Do not connect the cloud chamber water inlet feed to the bottle cap at this point.

8.2 Clock Battery

- It is recommended to measure the battery voltage; the battery is located under the rear fascia cover, remove the coin battery, and use a voltage meter to measure. An acceptable voltage is above 3V.
- Replace the battery into the holder and refit the cover.

8.3 Power ON:

- Insert the power terminal connector and turn ON the power source.
- The detector will take approximately 20 seconds to power up, including the display, pump, fan and ‘supply heathy’ LED to illuminate.
- **Note:** It is normal for the detector to display faults immediately after power up, where the buzzer will sound, and the fault LED is illuminated. If the detector does not power correctly, re-check all internal connections and re-try, if the fault persists contact your product Technical Support.
- Upon power up it is normal for the detector to instigate a water intake, refrain from connecting the water bottle until instructed.
- Set the time and date, consult section 9.11 Setting Time and Date
- Normalise the airflow, consult section 9.12 Airflow & Fan Settings

8.4 Connect the Water Bottle

- Install the water bottle in the Cirrus CCD detector (bottom right), connect the cloud chamber water intake tube to the adapter on the water bottle cap.
- Turn off the 24 V dc power supply, wait 10 seconds and then turn **on** the power supply.
- Ensure the correct the time and date is displayed. If incorrect, check battery voltage again, replace battery if voltage is low, otherwise contact product Technical Support.
- The power reboot will automatically instigate a water in-take. Visually inspect that water is being pumped into the system, if the detector reports a ‘No Water Fault’, repeat the process and reboot the power source at the detector.
- **Note**: it is common for two power cycles to be necessary to successfully fill the chamber. If the No Water fault persists, contact Technical Support.
- Check the average days between fills, ensure this count is below 1.0,
  consult Section 10 Site, Manufacturing, Service Information and Event log. If the count value is greater than 1.0 contact Protec Technical Support.

8.5 Detector Initialisation

- Upon powering up, the detector performs an initialisation routine: the process establishes the general background readings for both detection sensors; the cloud chamber and scatter chamber detector(s).
- Depending upon the model variant the initialisation time can take from 5 to 15 minutes. **Do not perform any smoke testing during this time.**
- Set the alarm threshold levels, consult Section 9.16 Sensitivity settings.
- Configure any optional setting such as: day and night threshold, Input and outputs, Network parameter etc. Consult the relevant sections in this document.
- Store detector commissioned status, consult Section 10: Site, Manufacturing, Service Information and Event log.

8.6 Test System

- The main commissioning and set up procedures have now been completed. However, it is an absolute requirement that **all** sampling points on the pipe network are individually fire/smoke tested for correct functionality and response on the aspirating detector. Each sampling hole should be verified against the sampling pipe calculations and any anomalies investigated and rectified. All programmed input/output configuration and responses should be tested and proven to be correct.

9 Commissioning the Cirrus CCD using the Detector Display

Consult Section 11 for commissioning the Cirrus CCD using the PC software.

Ensure all pipes configurations are clear of debris before final connection.

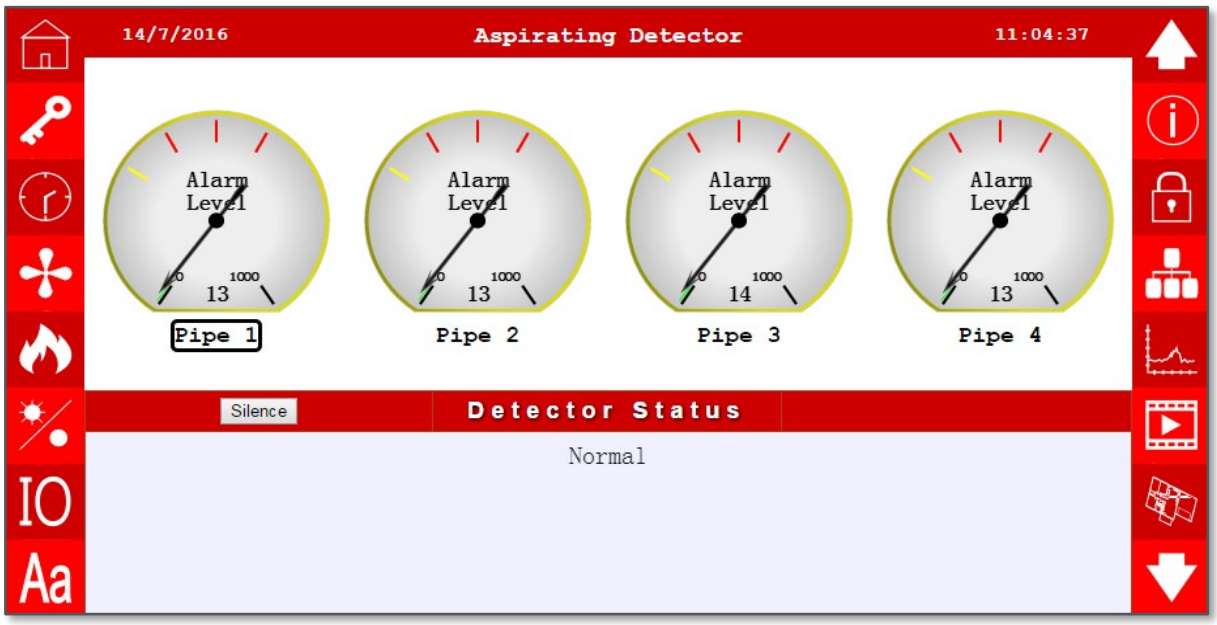
Ensure all sampling pipe configurations have been installed before supplying power to the ProPoint Plus detector.

The following examples are shown for all four pipe channels.

9.1 Display Overview

The Cirrus CCD is fitted with a 7-inch touch screen graphics display. There are no buttons other than those presented on the touch screen. LED indication is provided above the screen to indicate Supply Healthy, Fault, PreAlarm and Fire conditions.

The display is based on a series of webpages, utilising a comprehensive, easy to use and navigate menu system. Whilst the Cirrus CCD has its own graphic display the same menu system is accessible via the computer application program called ‘ProView’ connected via a local USB. Additionally, the menu system is also accessible remotely via a TCP/IP network connection. Consult Section 13 TCP/IP Connection.



9.2 Quick Navigation Button Icons

For quick navigation there are a series of graphical button icons permanently displayed on either side of the screen.


Return to Home Page – Section 9.8


Enter Access Code Button – Section 9.3


Set Time and Date – Section 9.11


Airflow and Fan Settings – Section 9.12


Sensitivity Settings – Section 9.16


Time Zone Settings – Section 9.17

Input and Output Settings – Section 9.19

System Text & Alarm Text – Section 9.22


Scroll Up a line (hold for fast scroll)


Site Information, Site Comments, Manufacturing Information & Event log – Section 10


Configure Access Codes – Section 9.3


Network Setup – Section 10.6


Realtime, Historic & Airflow Graphs – Section 10.7


Live Camera – Section 10.8


Pipe Plan – Section 10.9


Scroll Down a line (hold for fast scroll)

9.3 Access Codes

The menu functions are restricted until the correct access level code is entered, although the menus are viewable without the requirement of any codes. The access level codes remove restrictions, enabling the configuration, commissioning, and monitoring functions. Dependent upon the level of the access code entered, where the user has limited access, and the engineer has full access.

9.4 User Access Level Limitations

The user access level has limited editing capabilities, only these functions are available:	Set Time and Date Silence Faults and Fires Reset Fires View all Menus, Graphs and Logs i.e., Real time data graph, Historic data graph, Airflow data graph and Event log.

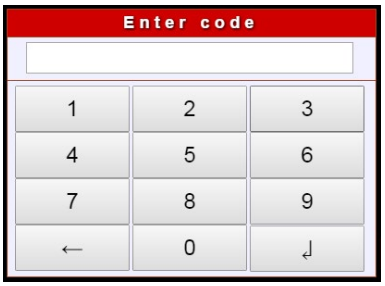
9.5 Default access level codes

User	**Engineer**
1 4 4 2	3 1 4 4 3 1

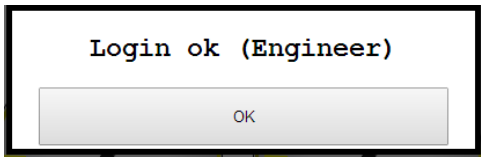
The default access code can be changed from the access code menu screen.

Click on the key button  to the left of the page.

Enter the access level code and click enter.

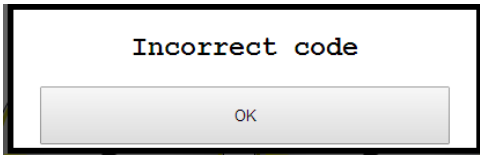


Upon a successful code entry, the icon background colour will change to black  .



A pop-up window message will appear confirming the Login ok (user or engineer).

If the code is unsuccessful the following message will appear.



The icon background will remain black while logged in and the access level will time-out after 4 minutes from the last screen touch or keypress.

Pressing the button icon key  will log-out from any access level.

9.6 Buzzer

The Cirrus CCD is fitted with an internal buzzer. The buzzer will sound when the detector is in a condition other than normal. The buzzer can be disabled in the I/O settings on the menu screen, detailed in Section 9.19

Buzzer parameters	Fault	Slow	1 second ON and 1 second OFF
	PreAlarm	Slow	1 second ON and 1 second OFF
	Fire	Fast	½ second ON and ½ second OFF

9.7 Adding or removing Airflow Sensor(s) [AFS]

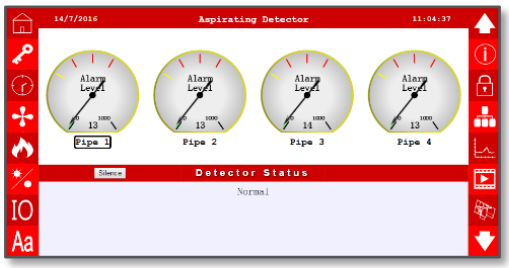
Should it be necessary to add and remove a AFS ensure the detector is powered down, remove the front cover, and unscrew the two captive screws as shown in Section 6. Open the front display cassette to access the AFS modules, add or remove the desired AFS. If adding an AFS, remove the blanking plugs on both the pipe connection port and the internal blower manifold before slotting the AFS into position. Ensure the AFS is securely positioned in the socket using the top and bottom retaining clips. When removing any AFSs ensure the inlet blanking plugs are fitted in the empty inlet spaces for both the pipe port and blower manifold.

The new configuration changes are to be saved into the system, consult Section 10.4 Advanced Options on how to save the hardware configuration.

9.8 Home Page

Select the home icon  .

The Home screen displays the Fire levels for all the connected pipes. The example to the right shows a 4-pipe detector, for detector models fitted with 3 or less pipes the dials are automatically centred and equally spaced.

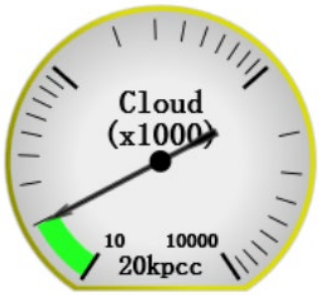


The Home screen displays the status of the detector listing any live ‘Fires and Faults’. The ‘Silence’ button will mute the buzzer during a fault or fire condition, during a fire condition a further ‘Reset’ button appears on the right-hand side.

A user or engineer access level code is required to operate the silence and reset buttons.

9.9 Fire sensor dial

The Cirrus CCD can display live read-outs from the Cloud [Fire] detection sensor within the home screen. To enable, enter user or engineer access level code and select on the desired individual pipe dial. The dials will be displayed above the detector status. Select the pipe again to remove.



9.10 Sensor scales and nominal values

Sensor	Description	Scale	Nominal values [Typ. Office application]
Cloud	Particles Per Cubic Centimetre [(ppc^3) x 1000]	10,000 to 10,000,000ppc^3	20k to 40k ppc^3
Carbon Monoxide (CO)	Parts per million [ppm]	0 to 500ppm	90 to 110 bits
Alarm Level	Combined Fire (cloud) and CO level mathematical algorithm	0 to 1000	18 to 40

9.11 Holding on a Pipe

The Cirrus CCD scanning model is capable of holding on a chosen pipe. It will then continuously sample on the chosen pipe only.

Benefits of the Function

Holding on a pipe is intended for **commissioning use only.** Enabling the hold mode generates a fault condition and will time-out after approximately 4 minutes. This is useful for testing purposes.

Operation

To hold a pipe, ensure you are logged in as an engineer. Select the pipe number, located under the Alarm dial, of the chosen pipe to be halted. The pipe number will highlight green to confirm hold mode has been enabled. Once the Cirrus CCD has completed the sample on its current pipe, it will jump to and remain on the selected pipe. A Pipe Scan Halted fault is generated to alert the user the Cirrus CCD is not in normal operation.

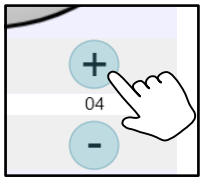
To cancel the selected held pipe, select the highlighted pipe number located under the dial. The highlight will disappear, the Pipe Scan Halted fault will clear, and the Cirrus CCD will begin scanning pipes as normal.

9.12 Setting the Time and Date

Select on the clock icon on the left-hand side. User or engineer access level code is required to operate the functions within this menu.

9.12.1 Set the time

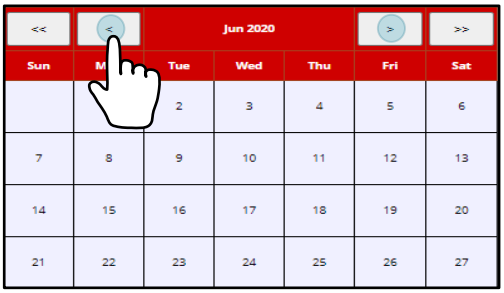
Tap, drag, and rotate the minute hand to the desired time.



Tap the + symbol to increment and the - symbol to decrement the hours & minutes.

9.12.2 Set the Date

Tap the >> and << arrows to navigate the year.



Tap the > and < arrows to navigate the month.

Tap on a number within its square to select the day.

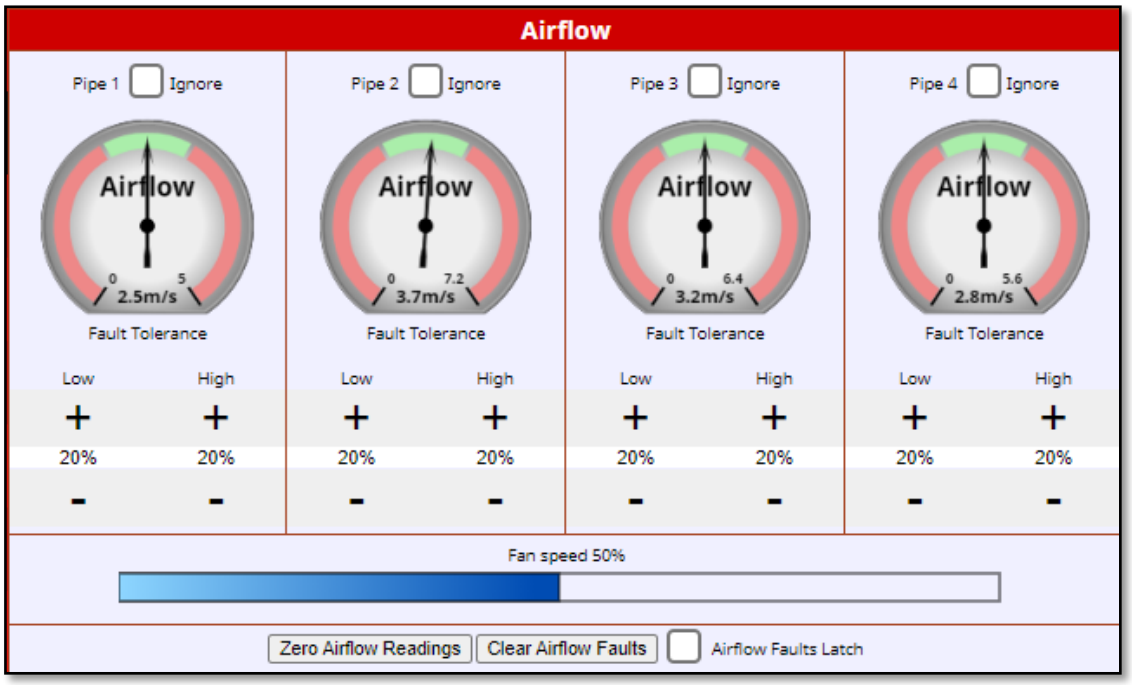
9.13 Airflow & Fan Settings

Select the airflow icon on the left-hand side. Engineer access level code is required to operate the functions within this menu.

Benefits of the Function

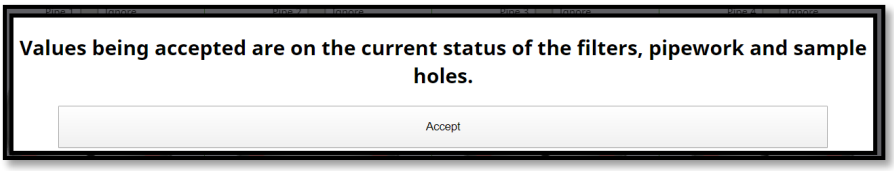
The airflow menu provides the following features:

- Display live airflow readings for each pipe (in meters per second: m/s).
- Display the fault tolerance threshold for each pipe (in percentiles: %).
- Configure high & low fault tolerance range from 5% to 75%.
- Temporarily disable airflow faults for each pipe (commissioning use only).
- Adjust fan speed (in percentage), configurable from 5% to 100%.
- Zero the airflow readings.
- Configure airflow faults to latch.
- Clear any latched airflow faults, when enabled.

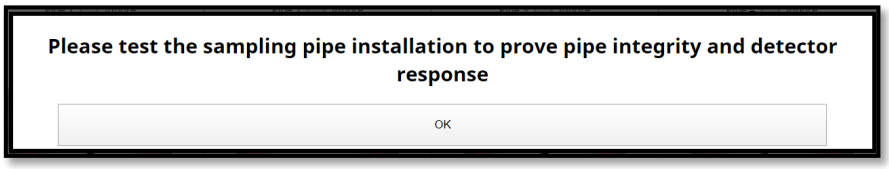


9.13.1 Zero Airflow Readings

Before accepting the airflow values, ensure all pipe configurations have been correctly installed to the recommended design guides and flow calculations, including pipe work, filters, and sampling holes. In addition, verify the fan speed is set to the requirements of the flow calculations. Any changes to the fan speed will require a wait of approximately 5 minutes to allow the airflow to stabilise. The airflow can then be accepted by selecting 'Zero Airflow Readings'.
Upon zeroing the airflow, a pop-up message will appear informing the user that the airflow values accepted are those of the current pipe status. Pressing accept to this prompt could mean that the airflow is calibrated with potentially contaminated filters, restricted or leaking pipe/joints or restricted sampling holes. Therefore, engineers should ensure the pipe installation is clean and has full operational integrity prior to acceptance. If any alterations are made to the pipework, filters or sample holes after the airflow has been zeroed, the airflow may need zeroing again.



After accepting the airflow changes a further message will appear prompting the user to check the pipe integrity and response time. A large change in airflow could affect detector response time: Perform a transport time test to check the response time remains within acceptable limits, refer to Section 10.4.



9.14 Airflow Fault Tolerance

The valid fault tolerance area is displayed on the dial in green. Both high and low fault tolerances can be adjusted in 5% increments using the **+** and **–** signs. Any reading in the red area generates a fault. The airflow fault is generated within 100 seconds, once the airflow reading is out of tolerance (arrow in the red).

Recommended tolerance set to +/- 20% (or less).

9.15 Airflow Fault Ignore

The airflow monitoring of any pipe can be ignored by checking the relevant ‘Ignore’ box. An ‘airflow ignored fault’ is generated to ensure the system cannot be left in a non-monitored state and is intended for commissioning use only.

9.16 Airflow Fault Latch

The airflow fault can be configured to either latch or non-latch. The default state is to non-latch. To enable airflow latching, select the ‘Airflow Faults Latch’ box, or vice versa to disable. Once enabled, the airflow faults will latch and can only be cleared by selecting either ‘Clear Airflow Faults’ or re-zeroing the airflow by selecting ‘Zero Airflow Reading’.

9.17 Sensitivity Settings

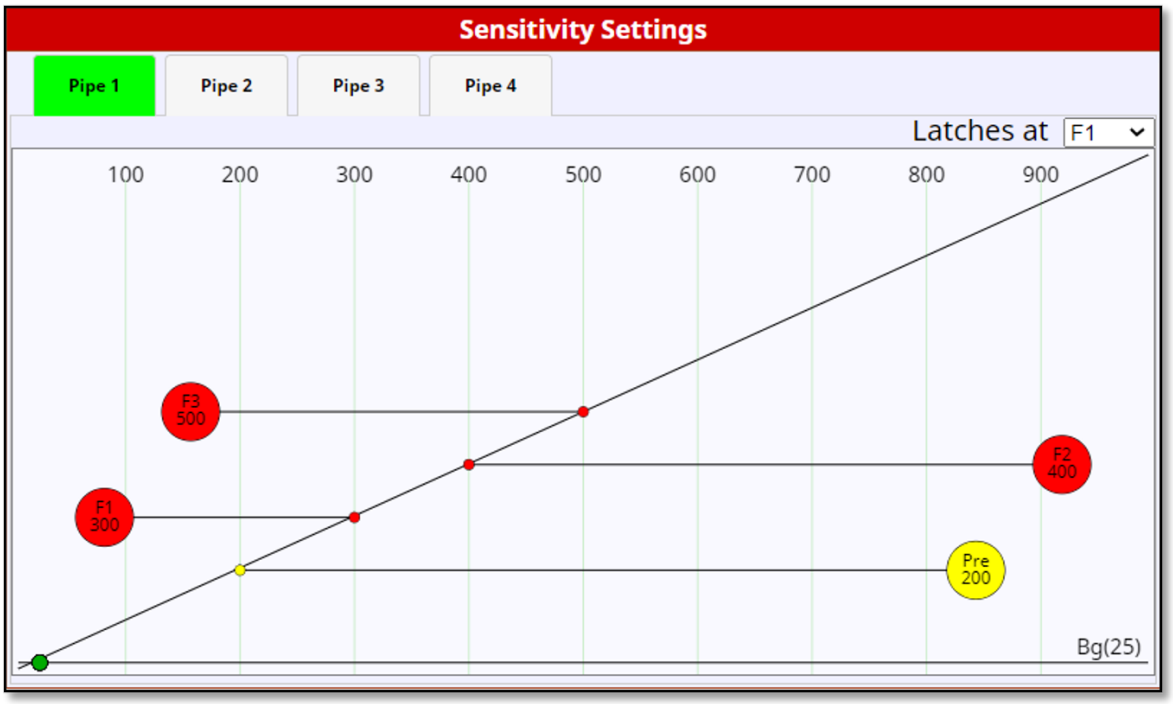
Select the sensitivity settings icon on the left-hand side. Engineer access level code is required to operate the functions within this menu.

Benefits of the function

The sensitivity settings menu provides the features to configure the alarm level thresholds, each level is dependent upon number of holes, transport time and approval requirements.

The Sensitivity Settings menu provides the following features:

- Program the alarm level thresholds for each pipe; PreAlarm, Fire 1, Fire 2, and Fire 3.
- With Timezone enabled: alarm threshold level can be programmed for each day and night.
- Alarm latching option for all thresholds; PreAlarm, Fire 1, Fire 2, and Fire 3.
- Alarm level background reading [bottom right: Bg()] per pipe.
- Live Alarm level read-out indication on the graph line by a green dot.



Operation

9.17.1 Alarm signal

The graph displays a live Alarm level read-out represented by a green dot on the diagonal line. The green dot is the fire signal generated from the cloud sensor in an alarm level scale of 1 to 999. When the green dot passes an alarm threshold it will activate.

9.17.2 Initialising Environmental Background Level

Powering up the detector instigates the ‘initialising’ stage, where the detector learns the background environment levels. During this time (up to 15 minutes, dependent upon model variant) the sensors measure and store the background levels of the environment. Thereafter, the background value is automatically updated to allow for any drift compensation.

It is recommended to set the first of the alarm thresholds to approx. 20% above the stored CSF background[1] and then leaving the detector running for seven days. During this time, the detector will automatically record any fluctuations in the sampled background. After the seven days, the data is to be evaluated using the historic graph feature. Whether there are fluctuations in the background or not, the data should be used as part of the guide when configurating the alarm levels.

If the background levels change dramatically from one time to another it is recommended to enable the ‘Timezone’ mode feature. The ‘Timezone’ feature enables two separate programmable time frames (labelled Day and Night), on each day of the week, total of 14 configurable alarm thresholds per pipe. Refer to Section 9.17.

[1] The averaged background value is located on the chart in the bottom right: Bg()

9.17.3 Providing Margin of Headroom

When configuring the alarm thresholds, we recommend leaving a margin of headroom above the desire threshold to allow for background level fluctuations within the environments. The headroom is very much dependent upon the application and fire classification. Time should be taken to study the environment conditions taking into any mechanical and seasonal changes. For example, more headroom is required for a ‘busy’ office type or warehouse environments compared to that of a ‘cleanroom’ computer suite.

The Margin of Headroom values should be based on the highest background particle level reading established during the initial soak test period for the environment.

9.17.4 Alarm Threshold Allocation

Important Notice:

It is critical that the alarm threshold is correctly configured for the application, and if design guides have not been provided, please request assistance and guidance from Technical Support or an authorised distributor.

Additionally, the Protec Proflow sampling pipe calculation program should be referenced to determine the correct design concept sensitivity setting for the specific application.

The tables below details the system configuration verified during the EN54-20:2006 fire tests.

Fire Class	Max Number of Sample Points	EN54-20 Compliant Maximum Alarm Level	Protec Recommended Maximum Alarm Level
Class C	16 per pipe	≤752	≤400
Class B	14 per pipe	≤147	≤145
Class A	8 per pipe	≤117	≤115

The above recommended settings are indicative only.

The application parameters can be affected by several factors, including ambient background particle levels, forced or natural airflows, activities carried out within the protected space, and numerous other environmental conditions.

As detailed previously, a soak test should always be carried out to identify the stable background particle levels and the therefore suitable alarm threshold points within different Class A, Class B and Class C applications.

In many applications it may be possible to set the alarm thresholds to provide an earlier warning than the Protec Recommended Settings, without providing nuisance alarms. If so, these higher sensitivity settings should be applied.

In some applications it may be necessary to set the alarm threshold points above the Protec Recommended Settings, due to the application factors detailed above. If so, the alarm thresholds should be set to the highest sensitivity setting to avoid unwanted alarms, however alarm thresholds **must not** be set above the product approvals parameters details above.

Regular checking of the detector sensitivity settings to improve detection performance is always recommended.

Protec strongly recommends all pipe designs are validated using the Protec Proflow Calculation application.

To adjust any alarm threshold, tap on the circle of desired level 

, enter the new alarm threshold level using the number keypad and tap enter. The new level cannot be lower or higher than another alarm threshold level already present.

European Standard Applications

Please be aware the table above indicates the maximum alarm threshold setting on a completed installation tested during EN54-20 fire tests. Set up includes: maximum number of holes, pipe length for a 4 pipe aspirating detector network. When smaller installations are considered, the detector will be more sensitive and may require alternative adjustment to the alarm level, please consult the **Important Notice** above.

9.17.5 Disabling Fire 2 and Fire 3 Alarm Thresholds [when not required]

The alarms thresholds Fire 2 and Fire 3 can be disabled by selecting the desired dot (F2 or F3), edit the threshold number to 0 and tap enter to accept changes. The circle should locate to the far right of the graph with the text OFF inside:

If the Fire 2 threshold is switched OFF **before** the Fire 3 threshold, the Fire 3 threshold will be switched off automatically.

9.17.6 Latching Alarm Activations

The latching level can be set using the drop-down box at the top right-hand side of the screen. The available options are Pre = PreAlarm, F1 = Fire level 1, F2 = Fire level 2 and F3 = Fire level 3 or None = latching disabled. If the detector reaches or exceeds the selected level, then events of the selected level or below cannot be cleared without a reset.

For Example: Latching level config to ‘F1’.

A fire has been detected; triggering PreAlarm, Fire level 1, Fire level 2 & Fire level 3.

The smoke level now decreases to typical background levels.

Fire Levels 2 & 3 are automatically cleared, Fire level 1 and PreAlarm remain active until reset.

9.18 Time Zone Settings

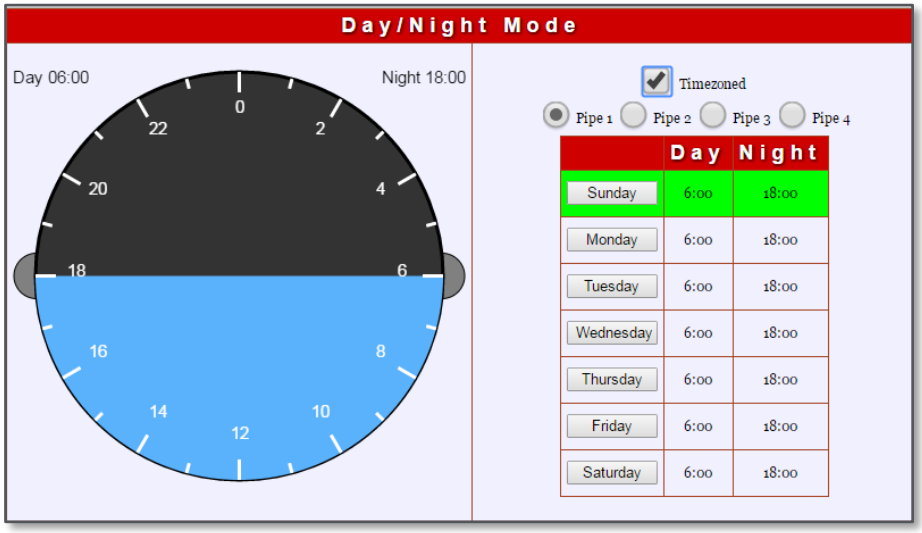
Select the time zone settings icon on the left-hand side. Engineer access level code is required to operate the functions within this menu.

Benefits of the Function

The Timezone feature enables multiple alarm threshold configurations and is used to vary the level of protection if found to be different at certain times of the day and/or week. An example of this could be a warehousing facility. During the day-time period the building could have significant movements of people, products, vehicles etc. all of which could influence/increase background particle level within the protected space. During the night-time period when the building is unoccupied the particle levels will likely reduce and therefore allow a more sensitive detection system during this period.

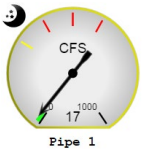
The Timezone Day/Night Mode menu provides the following features:

- 'Timezone' enable/disable tick box.
- A 24-hour clock, two areas; Blue = Day and Black = Night.
- Selectable pipe(s) to configure; 1 to 4.
- Selectable day tabs with current set time for day and night.
- Programmable time frames (labelled Day and Night), for each day of the week (Monday to Sunday), on each pipe inlet.



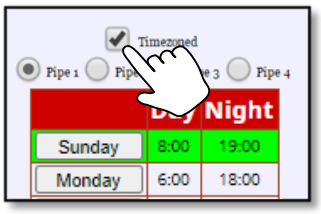
Operation

The 'Timezone' enables two separate programmable time frames (labelled Day and Night), for each day of the week (Monday to Sunday), on each pipe inlet. Providing a total of 14 individually programmable alarm thresholds per pipe**.** The alarms thresholds are configured within the sensitivity settings menu and the option will appear once the timezone is enabled.

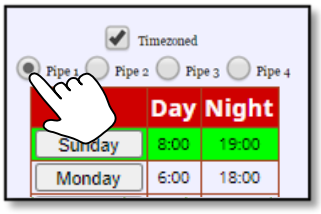


The home screen will display a moon symbol to indicate night mode is activated on the corresponding pipe.

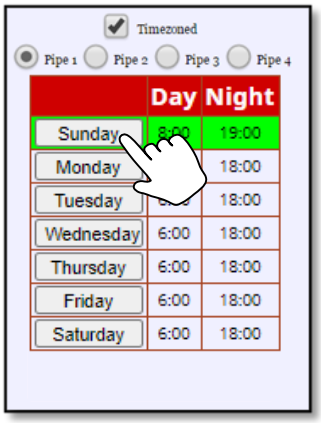
9.19 Enable Timezone and Setting the Time Frames.



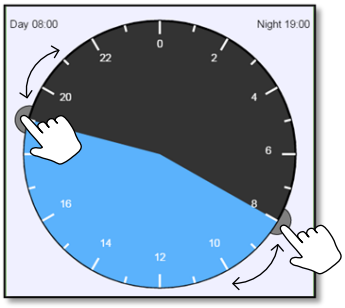
Tap Timezone to enable or disable the feature.



Tap the desired pipe number.



Tap the desired day.

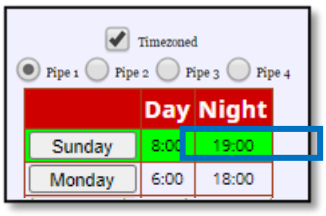


Tap and drag the two semi-circles within the 24 hour clock to the desired times. The adjustable clock moves in 15 minute increments.

In the example:

Day starts at 8:00 [blue] and

Night starts at 19:00 [black].



Confirm the time has been successfully set in the corresponding Day and Night column.

Repeat for each day and each pipe.

9.20 Input & Output Settings

Select the I/O settings icon IO on the left-hand side. Engineer access level code is required to operate the functions within this menu.

Benefits of the function

The input and output connections are to be used with third party equipment. The output function offers a range of triggerable events activating a contact change over. These can be connected to other devices or systems such as sounders, BMS equipment, fire/evacuation CIE etc.

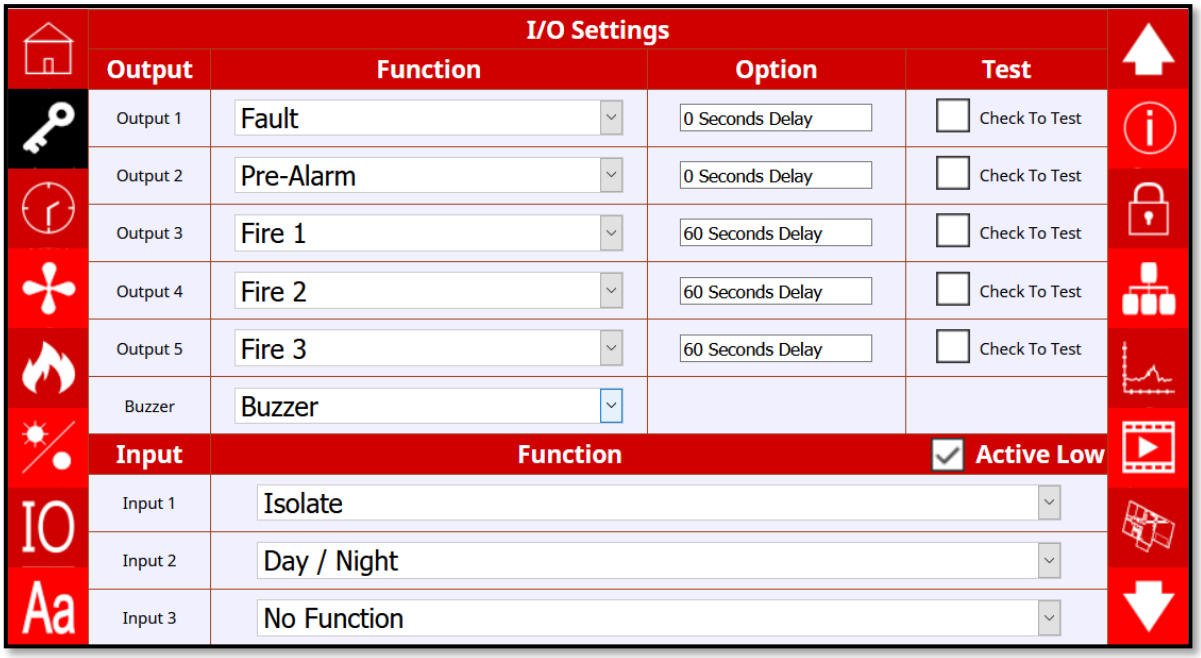
The inputs are a path to relay information back to the detector; either to response as an external fault or preform a specific function i.e., Silence, Reset, force timezone etc.

The I/O settings menu provides the following features:

- A list of functions to operate the outputs 1 to 5.
- Optional output delay in seconds for each output.
- An override output test 'Check To Test' box for each output.
- A list of functions controlled from the inputs 1 to 3.
- An active high or low option for the inputs.
- Enable/disable buzzer option.

Default settings:
Outputs all set to No Function.

Inputs all set to No Function.



9.21 Output Contacts

In normal condition (non-active) each output contact is open, upon an activation the contact closes (short circuit). The output contacts can be individually inverted for special applications, for more details contact Protec support. It is recommended any equipment connected to the clean contact outputs should debounce[1] the signal.
The Cirrus CCD has five clean contact outputs. The operation of each output can be user configured to change state upon the following functions.

Output Function	Description	Options
No Function	No output activation	Delay time
Fault	Output active with any Fault	0 - 2000 seconds
PreAlarm	Output active with any PreAlarm	
Fire 1	Output active with a Fire 1 on any pipe	
Fire 2	Output active with a Fire 2 on any pipe	
Fire 3	Output active with a Fire 3 on any pipe	
Pipe 1 Fire	Output active with any Pipe 1 fire only	
Pipe 2 Fire	Output active with any Pipe 2 fire only	
Pipe 3 Fire	Output active with any Pipe 3 fire only	
Pipe 4 Fire	Output active with any Pipe 4 fire only	
Double Knock	Output active upon a Fire on any two pipes (excluding PreAlarm) **Must not be used for activating gas suppression systems**	
Pipe 1 PreAlarm	Output active with a PreAlarm on Pipe 1 only	
Pipe 2 PreAlarm	Output active with a PreAlarm on Pipe 2 only	
Pipe 3 PreAlarm	Output active with a PreAlarm on Pipe 3 only	
Pipe 4 PreAlarm	Output active with a PreAlarm on Pipe 4 only	
Pipe 1 Fire 1	Output active with a Fire 1 on Pipe 1 only	
Pipe 2 Fire 1	Output active with a Fire 1 on Pipe 2 only	
Pipe 3 Fire 1	Output active with a Fire 1 on Pipe 3 only	
Pipe 4 Fire 1	Output active with a Fire 1 on Pipe 4 only	
Pipe 1 Fire 2	Output active with a Fire 2 on Pipe 1 only	
Pipe 2 Fire 2	Output active with a Fire 2 on Pipe 2 only	
Pipe 3 Fire 2	Output active with a Fire 2 on Pipe 3 only	
Pipe 4 Fire 2	Output active with a Fire 2 on Pipe 4 only	
Pipe 1 Fire 3	Output active with a Fire 3 on Pipe 1 only	
Pipe 2 Fire 3	Output active with a Fire 3 on Pipe 2 only	
Pipe 3 Fire 3	Output active with a Fire 3 on Pipe 3 only	
Pipe 4 Fire 3	Output active with a Fire 3 on Pipe 4 only	
Transport Time Indicator	Output active when transport time buzzer sounds	None

[1] debounce: An operation to remove the small ripple of current that forms when a mechanical switch changes state in an electronic circuit.

9.21.1 Check to Test

An output contact can be tested by selecting the corresponding ‘Check To Test’ box. Upon ticking the ‘Check To Test’ box the output will automatically change state and an ‘Output Override Fault’ will be generated as a reminder to revert the detectors output back for normal operation.

The ‘Check to Test’ feature only activates outputs local to the detector, therefore auxiliary equipment connected on the RS485 for example the IO expansion or ADRDP will not be activated.

9.21.2 Buzzer Enable/Disable

The buzzer output can be configured as follows:

Buzzer The buzzer is used for fault and fire events.

No Buzzer The buzzer is not used for fault and fire events.

9.21.3 Transport Time Indicator

An output may be configured to activate upon the beginning of a transport time event. This can be useful to engineers testing the transport times of pipes over a large distance, where visual or audible contact between the chosen test point and CCD cannot be maintained.

9.21.4 Options

Dependent upon on the function configured the option has two operations:

Delay time Where applicable a function can be configured to delay its activation by entering the desired time [0 to 2000sec] within the corresponding output ‘Option’ box.

9.22 Inputs

The Cirrus CCD monitors three configurable active inputs.

The inputs are activated by linking the connection to a local 0V. The monitoring of the activation is dependent upon 'active' mode configured, either **'active low'** or **'active high'**, where:

active low link input to local 0 V to activate.

active high removing the link from local 0 V to activate.

The inputs are by default active high, to change the active mode monitoring to active low; select the tick-box next to the text 'Active Low'.

The input functions can be configured to activate the following functions on receipt of the external input signal.

Input Function	Description	Displayed Message
No Function	Input ignored, signal non-operational	No Function
Isolate	Isolates transmission of all fire events to the Protec Fire Panel	Isolate
Silence	Silences the buzzer of all faults and fires	Silence
Reset	Resets the detector of all fires	Reset
Mains Fault	Signifies a mains fault from external input (PSU)	Mains Fault
Battery Fault	Signifies a battery fault from an external input (PSU)	Battery Fault
Day / Night	Reverses current sensitivity mode (i.e., Day becomes night; night becomes day). Typically activated by external key-switch	Day / Night
Pause AF	Airflow changes are not monitored for the next 15 minutes (typically used with auto pipe purging systems[1])	Pause AF
Disable AF	Monitoring of airflow faults is disabled (existing airflow faults removed) (when environmental conditions are suspect to change therefore cause nuisance or intermittent airflow fault activations[1])	Disable AF
Pipe Break Fault	A fault will be displayed in cases where an End of Pipe Monitor is installed on the pipe system and a break in the pipe has occurred.	Pipe Break Fault

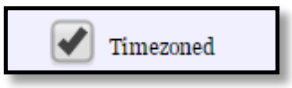
[1] The Pause AF and Disable AF functions are intended for special applications and not recommended for general use. The functions do not comply the EN54: Part 20. Enabling either function requires authorized declaration by the user.

9.23 Enabling alternative sensitivity/alarm threshold mode (Day/Night)

The ‘Day/Night’ input is used to manually switch to the alternate alarm thresholds or night mode.

To use this feature;

1. Enable (tick) the timezone function, consult Section 9.17.



2. Set the alarm thresholds for each day of the week, where ‘day’ is the normal thresholds and ‘night’ is the alternative. Ignore the times they are not required.

3. Disable (un-tick) the timezone function.

4. Configure the input function to ‘Day/Night’, select how the input will be activated, either active low or active high and configure the remote switching method for this.

5. The settings will automatically save within a time frame of 30sec, do not power down during this period.

9.24 System Text

Select the system text icon Aa on the left-hand side. Ensure you are logged in with the engineer access level to edit.

Benefits of Function

The system text menu allows for customising the names of the detector title, pipes, and alarm stages; to provide a quick visual correspondence to the area/zone to which the detector/pipes are protecting.

The following information can be customised:

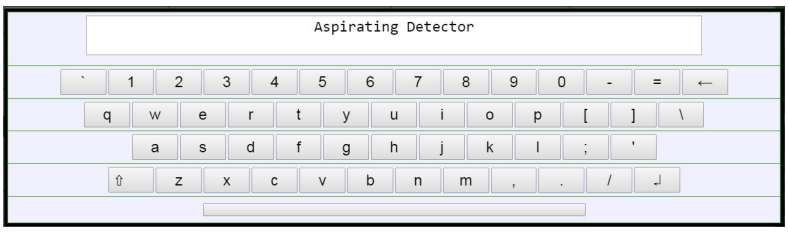
- The detector text title name; displayed at the top of the home screen.
- The pipe text name(s) (pipes 1 to 4), displayed in the detector status during an alarm or fault condition and in the event log.
- The alarm text names (PreAlarm, fire 1 to 3), displayed in detector status during an alarm condition and in the event log.

Default text shown in the example.

System Text	
Unit Text	Aspirating Detector
Pipe 1 Text	Pipe 1
Pipe 2 Text	Pipe 2
Pipe 3 Text	Pipe 3
Pipe 4 Text	Pipe 4
Alarm Text	
PreAlarm Text	Pre-Alarm
Fire 1 Text	Fire 1
Fire 2 Text	Fire 2
Fire 3 Text	Fire 3

When the data is correct select the enter button ↵ to accept the data.

The data will revert back to previous saved text if access level times out after four minutes.



10 Site, Manufacturing, Service Information and Event Log

Select the information icon ⓘ on the right-hand side. Engineer access level code is required to operate the functions within this menu.

Benefits of the Menu

The information section provides the following features:

- QR Code Link to the aspirating detector section of the Protec website: www.protec.co.uk.
- Software versions.
- Site address and comments.
- Manufacturing information.
- Service and Commissioning information.
- Transport Time.
- Event Log.
- Advanced options.

10.1.1 QR Code

The QR code provides a link to the protec.co.uk website where the products manuals can be downloaded.

If desired the QR link can be changed, please contact Protec Support for information.

10.1.2 Software Versions

Use the scroll down icon ⬇ to display all installed software versions.

10.1.3 Site Address

Scroll down to the site address information.

This menu is provided to enter and store basic site information at time of commissioning.

Site Address	
Location	Protec
Commissioned By	Engineer David Cope Date 12/05/2020
Site Name / Number	125468
Contact	Sam Smith
Address	Protec House, Churchill Way, Nelson
Post Code	BB89RT
Phone	01282 717171

10.1.4 Comments and Manufacturing Information

Scroll down to the comments and manufacturing information.

The comments can be used to add notes deemed useful for future reference.

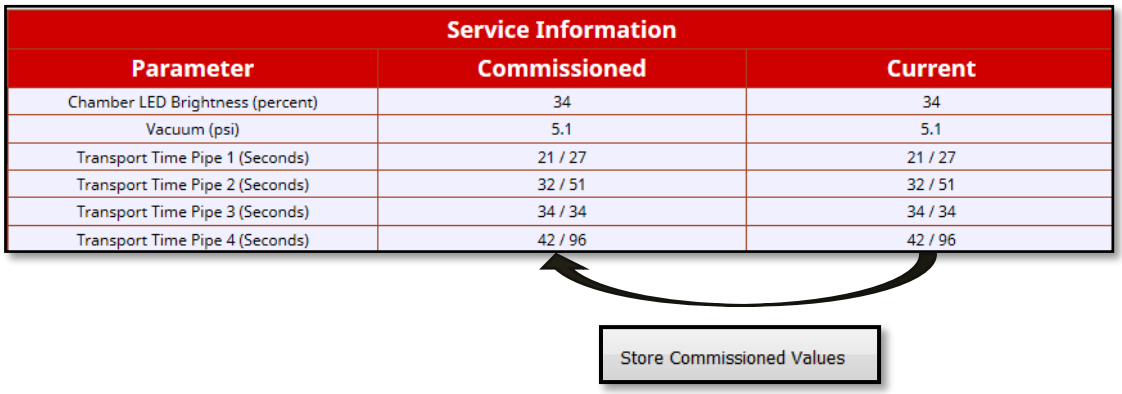
The manufacture information is stored at time of product production and is hard coded into the detector's memory including a unique serial number for product batch identification.

Comments	
Service date 15/06/2020, Next service date 15/12/2020	
Manufacturing Information	
Manufacture Date	13/12/2018
Serial Number	231457
Detector Life	4053h
Tested By	H.Allen

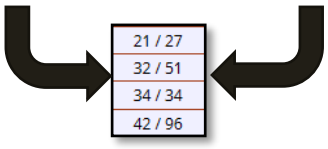
10.1.5 Service Information

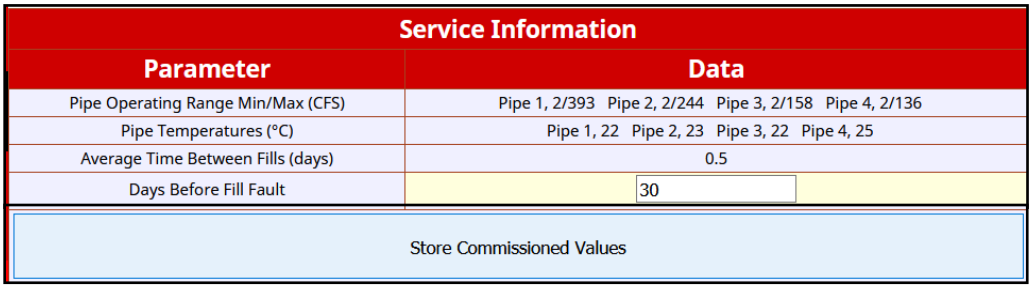
Scroll down to the service information.

Service information displays the current readings and the stored commissioned readings. Where the currents readings are stored in memory, using the ‘Store Commissioned Values’ button, upon completing the detectors commissioning.



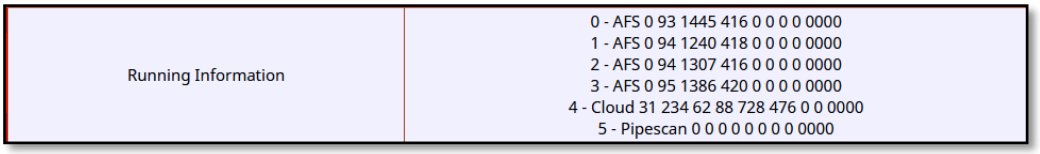
Service Information		
Parameter	**Commissioned**	**Current**
Chamber LED Brightness (percent)	34	34
Vacuum (psi)	5.1	5.1
Transport Time Pipe 1 (Seconds)	21 / 27	21 / 27
Transport Time Pipe 2 (Seconds)	32 / 51	32 / 51
Transport Time Pipe 3 (Seconds)	34 / 34	34 / 34
Transport Time Pipe 4 (Seconds)	42 / 96	42 / 96

Parameter	Description
Chamber LED brightness (percent)	Automatic drift adjustment is controlled using the LED brightness. When the brightness raises to a level >99% a fault condition is generated.
Vacuum (psi)	Monitored Vacuum pump pressure; <4.7 psi generates a fault condition.
Transport Time Pipe x (seconds)	Time stored during transport test, consult Section 10.2. Furthest Sampling point Test Point 



Service Information	
Parameter	**Data**
Pipe Operating Range Min/Max (CFS)	Pipe 1, 2/393 Pipe 2, 2/244 Pipe 3, 2/158 Pipe 4, 2/136
Pipe Temperatures (°C)	Pipe 1, 22 Pipe 2, 23 Pipe 3, 22 Pipe 4, 25
Average Time Between Fills (days)	0.5
Days Before Fill Fault	30
Store Commissioned Values	

Parameter	Description
Pipe Operating Range Min/Max	The averaged operating alarm level value (minimum and maximum). Intended to identify the appropriate alarm thresholds level during commissioning 'learning the background' and any adjustment thereafter.
Pipe Temperature (°C)	The temperature of the sampled air as it arrives at the Cirrus CCD detector.
Average Time Between Fills (days)	The averaged time (in days) the cloud chamber requests additional water to replenish the water reservoir.
Days Before Fill Fault	The 'average time between fills' is monitored for consistency and if the amount is greater than the limit set (default 30 days); a fault condition is generated called 'water consumption fault'. This configurable level is dependent upon application environment, for example humid compared to dry climates will differ in the amount of water that is evaporated during the sample process. The limit must not be set above 40 days. Setting the value to 0 disables the fault monitoring. Disablement of this fault should only be actioned under justified circumstances.



Running Information	0 - AFS 0 93 1445 416 0 0 0 0 0000 1 - AFS 0 94 1240 418 0 0 0 0 0000 2 - AFS 0 94 1307 416 0 0 0 0 0000 3 - AFS 0 95 1386 420 0 0 0 0 0000 4 - Cloud 31 234 62 88 728 476 0 0 0000 5 - Pipescan 0 0 0 0 0 0 0 0 0000

Running Information	Only available in Engineer access level code. Running information provides raw data from each internal module fitted within the detector and is used for evaluation and diagnosing purposes.

10.2 Transport Time Test

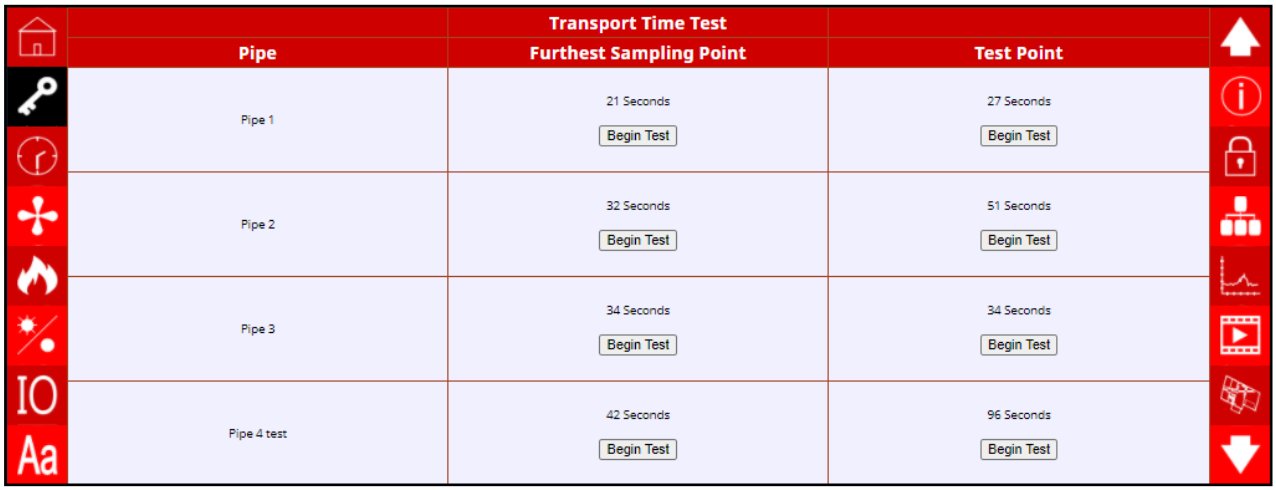
Scroll down to the Transport Time Test. Engineer access level code is required to operate the functions within this menu.

Benefits of the Function

The transport time test is used by the engineer at the time of commissioning to check and store the transport time of each pipe on the system. The transport time is tested either from a designated test point on the system, or the sample point at the furthest end of each pipe run. This stored time can be used on future service visits as a reference point comparison for the original installation. Any time differences should be investigated as this could indicate contamination/leaks/blockages of sampling holes, sampling pipes and filters etc.

Operation and Commission

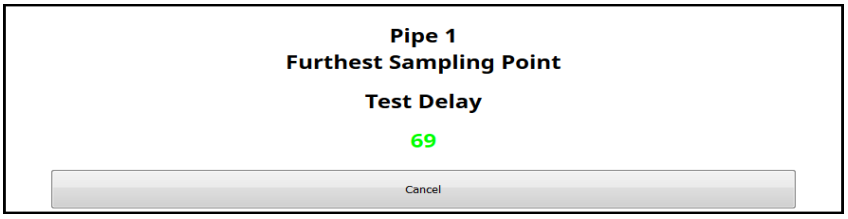
To initiate a test, click the Begin Test button for the chosen pipe and selected test point from the transport test screen.



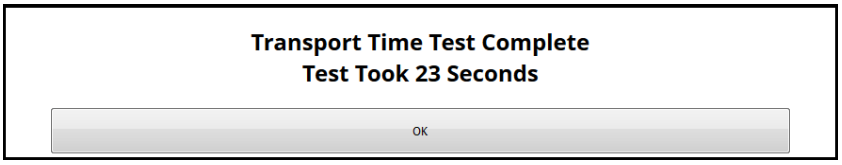
The Cirrus CCD will then ask for a delay time (in seconds) to be entered.

This is the time in seconds between the 'Begin Test' button being pressed and the test starting. This delay is to enable the engineer to get to the required sample point to inject the smoke sample. Valid delays are between 1 and 600 seconds.

After entering the delay, a countdown timer will commence.



When the timer expires the buzzer will sound, this is to signal the engineer to inject the test smoke. At this point the counter will begin to increment until the Cirrus CCD detects a fire. Once a fire level is detected, the display will show a test completed box, and the transport time can be stored.



If the buzzer volume is not sufficient due to the distance of the sampling hole/test point, one of the outputs can be configured as a transport time indicator, an external sounder/beacon could be connected to enhance the buzzer volume.

The transport time must comply to the approval requirements:

EN54 Part 20 [Class C & Class B] – 120 seconds

EN54 Part 20 [Class A] – 60 seconds

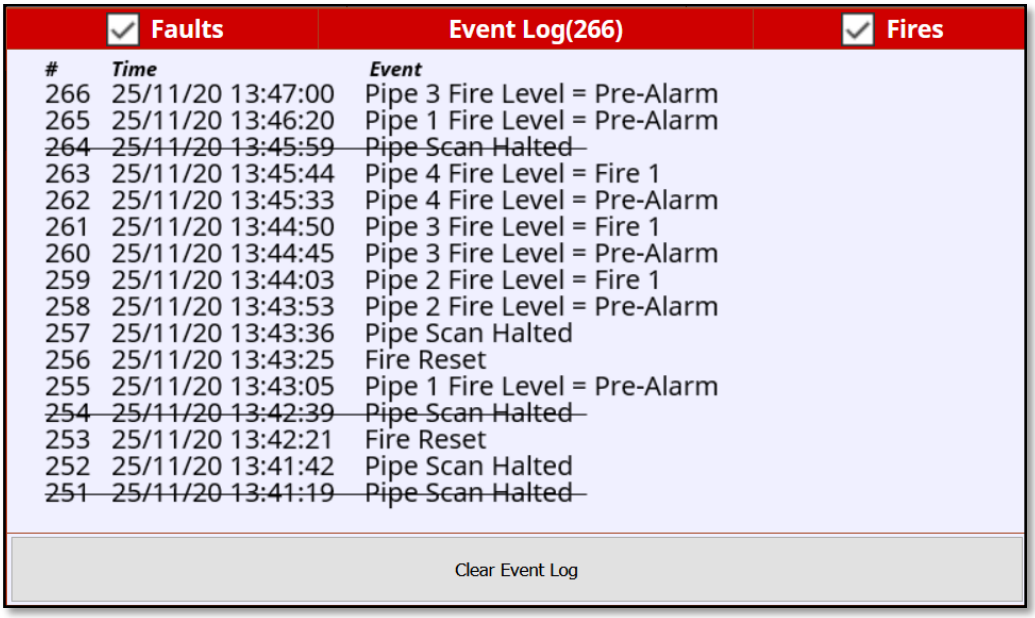
10.3 Event Log

Scroll down to the Event Log.

The Cirrus CCD stores the historic log of all fires, faults, and other events within the event log. A maximum of 256 events can be stored. Once the maximum number of events is reached, new events are stored while the oldest events are removed.

The User access level code allows the user to scroll through the events and filter between faults and fires, the engineer access level code is required to clear the event log history.

To clear the event log, select the 'Clear Event Log' button.

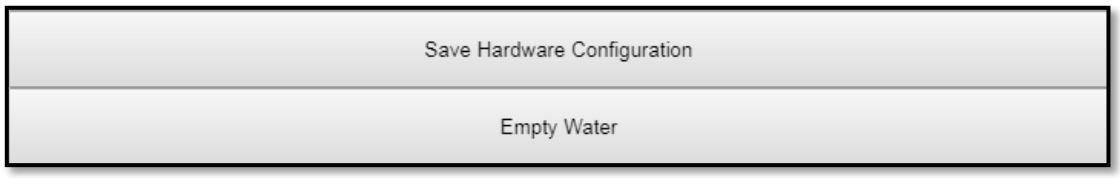


10.4 Advanced Options

Scroll down to the advanced options. Engineer access level code is required to operate the functions within this menu.

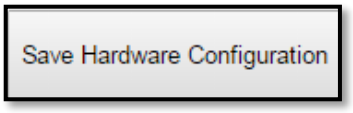
Benefits of Function

Save Hardware Configuration	When AFS's are added or removed (consult Section 16.9.3) it is necessary to save the new detector configuration.
Empty Water	Temporarily opens the water valve on the cloud chamber allowing water to be removed.



Operation

10.4.1 Save Hardware Configuration



Press the 'Save Hardware Configuration' button to store the current Cirrus CCD configuration.

Confirmation the settings have been successfully saved shall be displayed as shown:

If the confirmation pop up does not appear then the settings have not been saved.

10.4.2 Empty Water

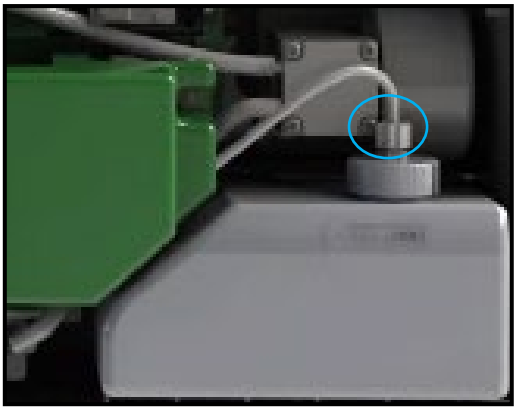
A waterless (dry) cloud chamber will not function as a detection sensor.

Ensure the detector is appropriately isolated or disabled from the buildings fire detection system.

It is important when transporting a Cirrus CCD, the water in the cloud chamber is emptied.

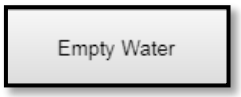
Instructions to remove the water from the chamber:

1. Attach a syringe or a similar device to the water inlet tube; marked in the image below.



2. Enter the engineer access level code.

3. Select ‘Empty Water’

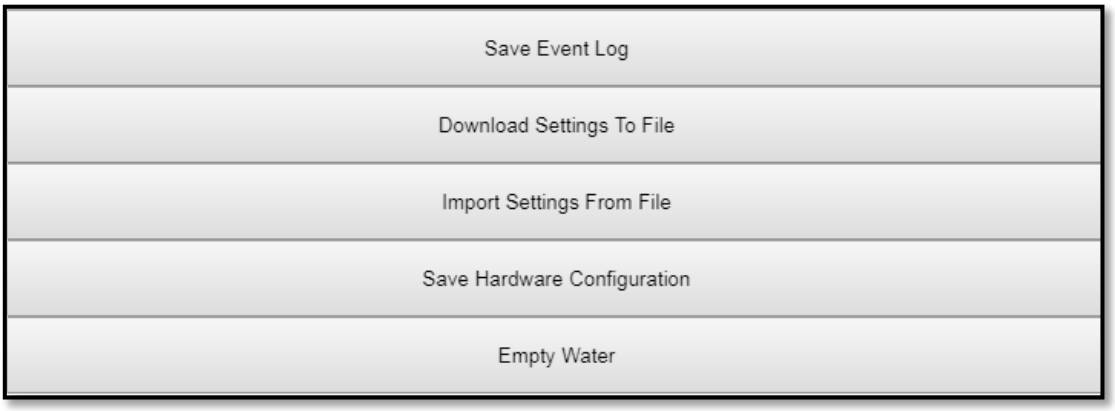


4. Once confirmed the water valve will release for 15 seconds. The valve will not release until the cloud chamber has finished its current sampling cycle.

5. Begin to withdraw the water using the syringe.

6. Visually inspect the chamber. If the chamber is still not empty, repeat the procedure by selecting on ‘Empty Water’.

Additional options are available only when the Cirrus CCD is connected to the PC application tool ‘ProView’:



Save Event Log	This option can only be viewed from the web browser. The CCD event log is saved as a text file, allowing the log to be stored and viewed remotely.
Download Settings To File	This option can only be viewed from the web browser. This option saves a copy of the CCD detector settings as a text file, which can be stored as a backup or edited in order to be imported later.
Import Settings From File	This option can only be viewed from the web browser. This option allows a previously downloaded file to be uploaded to another detector either to restore a backup or to duplicate the settings on another Cirrus CCD detector.

10.5 Access Codes

Select the access codes icon on the right-hand side.

Benefit of Function

The user and engineer access level codes can be changed to a customised number code of digits ranging from 0 to 9.

Operation

The current user access level code can only edit the User code.

While the current engineer access level code can be used to edit both user code and engineer codes.

The codes can be up to 8 digits.

The first digit of the code cannot be 0.

The user cannot change the engineer code.

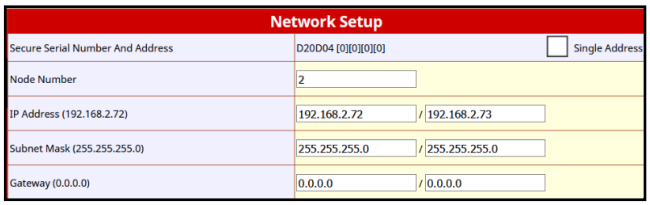
10.6 Network Setup

Select the network icon on the right-hand side. Engineer access level code is required to operate the functions within this menu.

Benefits for function

The network menu contains the following parameters:

- Secure Serial Number and Address.
- Node Number (RS485 Network Identification).
- IP Address, Subnet Mask and Gateway.
- Camera(s) [1 to 6] (URL image feed).



Operation

10.6.1 Secure serial number and address

- Protec 6000 Loop serial number, a unique number embedded at manufacture to enable intelligent monitoring over a secure network to Protec Fire Panel(s) (Optional).
- Device address assigned from the Protec Fire Panel to each pipe. To view the addresses, perform a Report Visual Address Verification [RVAV] from the Protec Fire Panel - consult the relevant Protec Fire Panel manual for instructions.
- Instead of using a unique address for each pipe, the Cirrus CCD can be set to function using a single address and therefore a single serial number; to enable select the Single Address box located on the top right of the display, engineer access level required.

10.6.2 Node Number

The Node number is an individual number assigned to the detector, used for local area networks, TCP/IP and RS-485 communications.

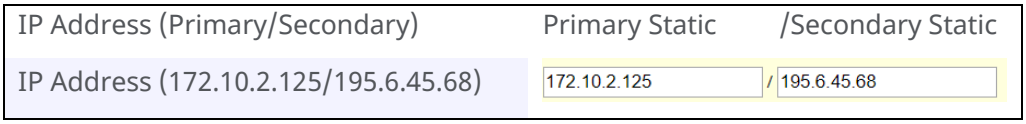
Node numbers must be assigned if an Aspirating Detector Remote Display Programmer [ADRDP] is used.

Setting the Node number to 0 disables the network communications.

10.6.3 IP address, Subnet Mask and Gateway

IP address, Subnet Mask and Gateway addresses are either automatically assigned by network (DHCP) or manually input as a fixed address.

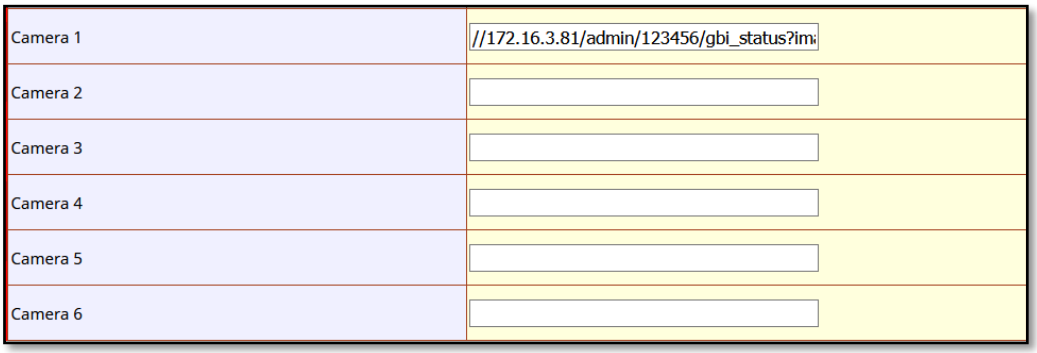
Example shows addresses assigned by DHCP:



- Primary: The address is either automatically (DHCP) or manually assigned (static address), when used for monitor and control over TCP/IP.
- Secondary: The address is either automatically (DHCP) or manually assigned (static address) when using the camera connection and/or monitor and control over TCP/IP, port :8080.

10.6.4 Camera

Consult Section 10.8 Live Camera for details on how to commission URL Scripts for IP camera.



10.7 Real Time, Historic and Airflow Graphs

Select the graph icon on the right-hand side.

Benefits for function

The graphs menu contains the following parameters:

- View realtime sensor values (pipes 1 to 4)
- View historic sensor values (pipes 1 to 4)
- Clear historic graph function
- View historic airflow values (pipes 1 to 4)
- Zoom to a specific point in historic graphs

Engineer access level code is required to operate the functions within this menu, any other user is limited to viewing only.

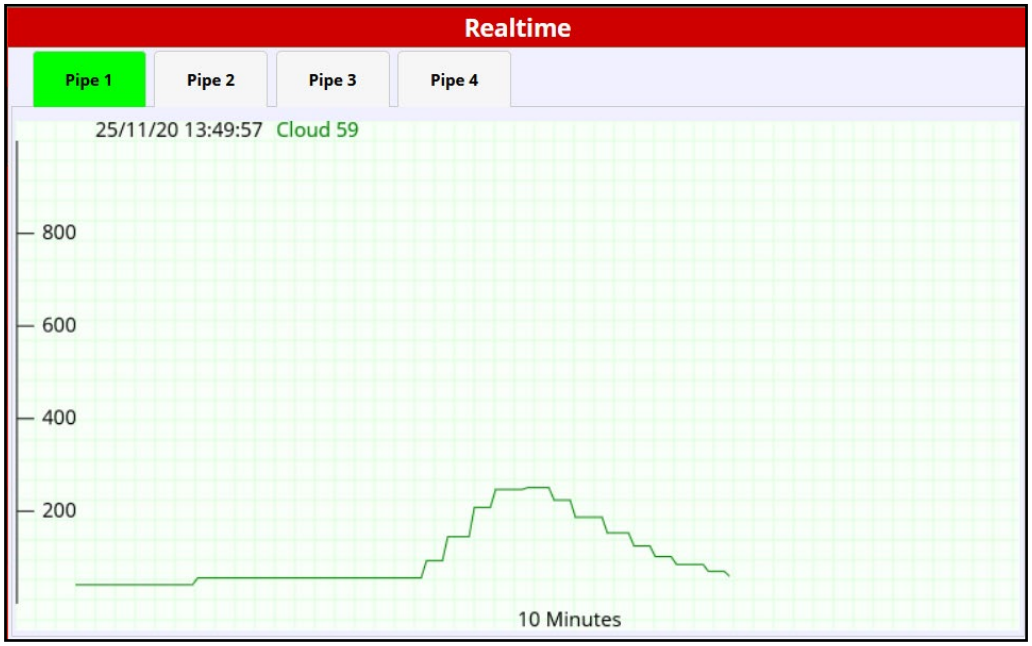
In order to scroll between the different graphs, use the and arrows.

Operation

10.7.1 Real Time Graph

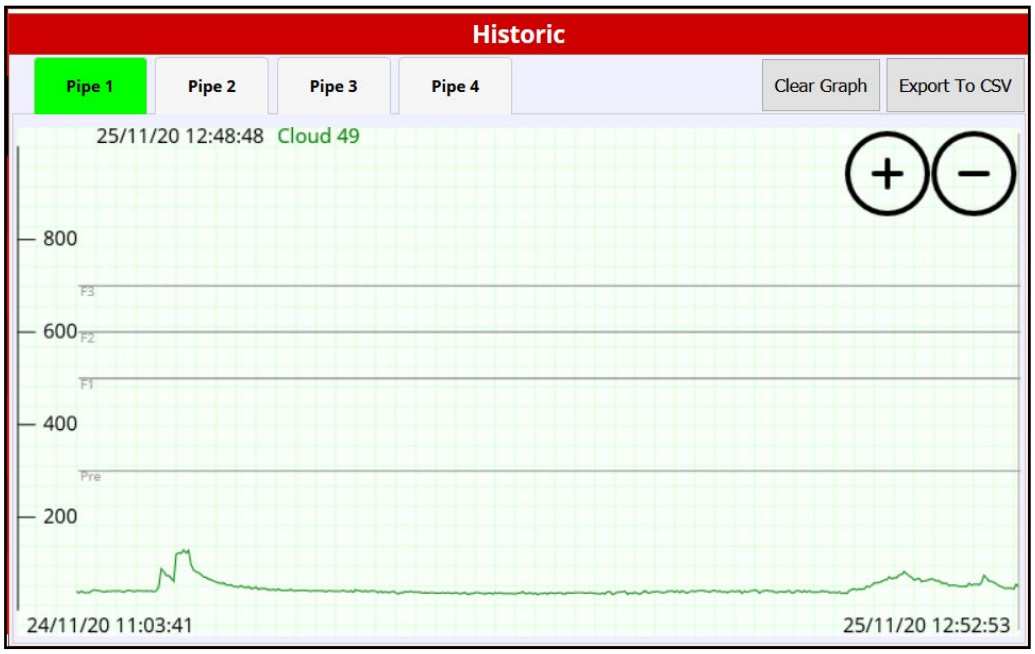
The Cirrus CCD displays a graph of the cloud value in real time. The values are displayed in analogue bit format to allow for each scale to be appropriately presented in the graph. The time frame duration is 10mins. The plots are viewable for each pipe by selecting the tabs shown at the top left of the plot. The fire alarm thresholds labelled Pre (PreAlarm), F1 (Fire 1), F2 (Fire 2) and F3 (Fire 3) are referenced within the plot.

This graph is useful for live fire testing.



10.7.2 Historic Graph

The Cirrus CCD displays a historic graph of the cloud values. To save memory; in normal condition the graph is updated every 4 minutes, in the case of a sudden rise the graph updates every 10secs. The graph will provide approximately 30 days of historical particle level data dependent upon activity. The values are displayed in analogue bit format to allow for each scale to be appropriately presented in the graph. The fire alarm thresholds labelled Pre (PreAlarm), F1 (Fire 1), F2 (Fire 2) and F3 (Fire 3) are referenced within the plot.



The display can be zoomed IN and OUT using the ⊕⊖ buttons. Selecting a point on the graph updates the time and signal values to the point selected.

The graph can be dragged left and right by pressing and holding on the graph then moving left or right.

10.7.3 Clear the Graph

Select the ‘Clear Graph’ button located at the top right of the plot, engineer access required.

10.7.4 Save a Copy of the Graph

Select the ‘Export to CSV’ button located at the top right of the chart. The graph data will be saved to a .csv document that either can be opened it Microsoft Excel, or opened with ProView, select tab ‘view’ and GraphView. The default browser will open, select browse and locate the downloaded graph to open. This option is only available when connected via a PC, refer to Section 11.

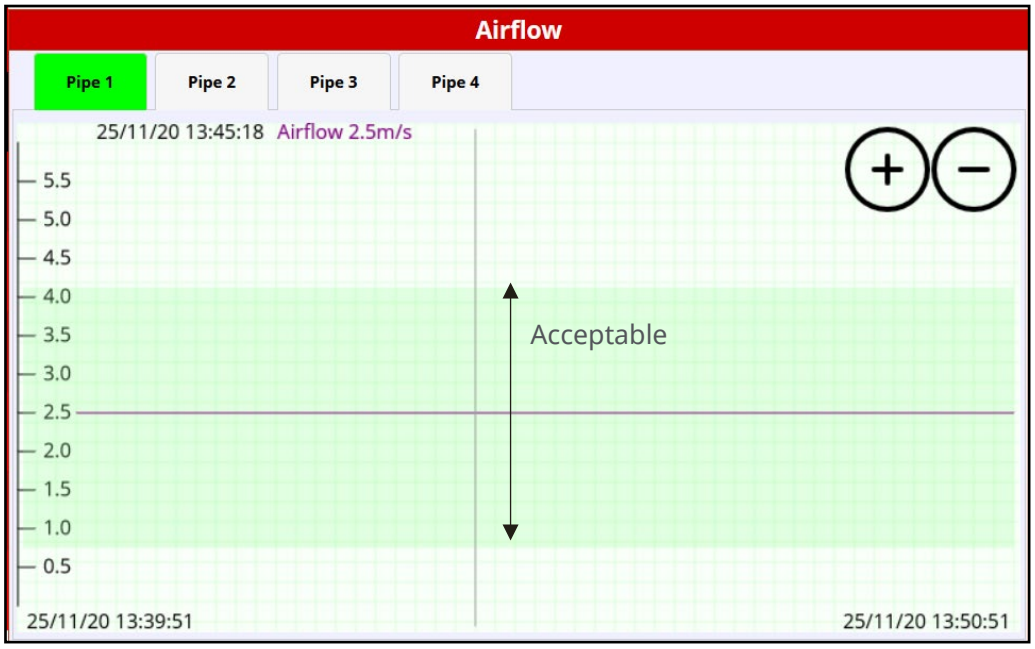
10.7.5 Airflow Graph

The airflow data is stored on a historic graph with data retention of approximately 4 weeks. Once airflow has been zeroed a light green bar is positioned on the graph to indicate the valid airflow fault tolerance level.

To save memory; in normal condition the graph is updated every 4min. The plots are viewable for each pipe by selecting the tabs shown at the top left of the plot.

The display can be zoomed IN and OUT using the ⊕⊖ buttons. Selecting a point on the graph updates the time stamp and airflow value at that point in time.

The graph can be dragged left and right by pressing and holding on the graph and moving left or right.



The purpose of this graph is to try to assist engineers when identifying the type of airflow fault, for example:

1. If the graph shows a sharp rise to the top side of the green bar, this could indicate a relatively quick increase in airflow possibly identifying a pipe fracture.

2. If the graph shows a sharp fall to the bottom side of the green bar, this will indicate a relatively quick decrease in airflow possibly identifying a pipe blockage.

3. If the graph shows a gradual rise to the top side of the green bar (over a number of days or weeks), this could indicate a possible pipe joint or other connection leak getting worse and requiring attention.

4. If the graph shows a gradual fall to the bottom side of the green bar (over a number of days or weeks), this could indicate possible dust contamination of the sampling pipe, sampling holes or filters and that simple maintenance could resolve the issues.

10.8 Live Camera

Select the camera control icon . Engineer access level code is required to operate the functions within this menu.

Benefits of the function

The Cirrus CCD is capable of accessing six live feed IP cameras. The camera(s) installed could monitor the same coverage area as the detector. Therefore, upon an alarm event, whether it be a PreAlarm or a fire alarm, the area can be viewed using the live feed on the Cirrus CCD display. The initial inspection can be performed without having to physically enter the potentially hazardous area.

Operation

Providing the camera details have been configured and the network connections established refer to network setup; section 10.6, follow the instructions for either: Adding a camera with a fixed IP address (Section 10.8.1) or Adding a camera to an existing network (Section 10.8.2). Select the desired camera from 1 to 6, the Cirrus CCD will automatically connect, and the camera image will be displayed. Engineer access code is required when selecting a camera.

10.8.1 Add a Camera with a Fixed IP Address

A fixed IP network is required when there is no DHCP capability.

1. For simplicity, when only 1 camera is required use the manufacturer's default IP address. The default IP address can be found either in the manufacturer's instructions or by contacting the manufacture directly. In most cases the cameras default IP address can be set by resetting the camera, follow the manufacturer's instructions to reset the camera.

2. When installing 2 or more cameras manually set each camera to a **fixed IP address**, follow the manufacturer's instructions.

3. Disable the **user authorisation** access to the camera, follow the manufacturer's instructions.

4. Setup the Cirrus CCD network, in the Network Setup Menu, secondary column (right hand side).

The Cirrus CCD display network must be on the same network as the cameras.

For example:	Camera (default) IP Address:	172.168.0.10
	Subnet mask:	255.255.255.0
	Gateway:	Not required
	Cirrus CCD IP Address:	172.168.0.11

Network Setup		
Secure Serial Number And Address	D20D04 [0][0][0][0]	Single Address
Node Number	2	
IP Address (192.168.2.72)	192.168.2.72 / 192.168.2.73	
Subnet Mask (255.255.255.0)	255.255.255.0 / 255.255.255.0	
Gateway (0.0.0.0)	0.0.0.0 / 0.0.0.0	

5. In Network Setup menu, enter the cameras stream image URL script (refer to Section 10.8.3) in the desired camera location [1-6].

Camera 1	//172.16.3.81/admin/123456/gbi_status?im:
Camera 2	
Camera 3	
Camera 4	
Camera 5	
Camera 6	

6. Connect the CAT5 cable from the camera to the Cirrus CCD camera port. Some cameras are powered over the Ethernet cable and will require a power over Ethernet hub switch.

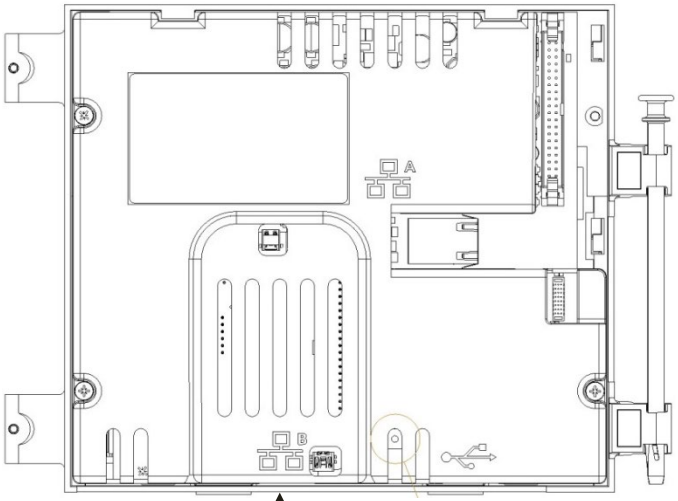
7. Wait 60 seconds to ensure the data has been stored into memory. Cycle the power OFF then ON to the Cirrus CCD detector. Navigate to the Network Setup menu and confirm the new network settings and camera URL information has been successfully retained.

8. Ensure the engineer access code has been entered successfully before selecting a camera. Select the desired camera in the camera control menu. The camera will automatically connect, and the camera image will be displayed.

10.8.2 Add a Camera to an Existing Network

Existing network with Dynamic Host Configuration Protocol (DHCP) capability.

1. Request a **static IP address** for the existing network from the IT department. Set the camera or cameras to the static IP address provided, follow the manufacturer's instructions.
2. Disable the **user authorisation** access to the camera and follow the manufacturer's instructions.
3. Ensure the Cirrus CCD detector is switched off.
4. Connect the RJ45 Plug (CAT5 cable) from the Cirrus CCD camera port to the existing network.



5. Switch on power. The Cirrus CCD will automatically (DHCP) assign itself an IP address. The assigned address for the IP address, subnet mask and gateway are displayed on the network setup menu in brackets following the /, for example:

Secure Serial Number And Address	[0][0][0][0]
Node Number	0
IP Address (0.0.0.0 / 172.16.3.64)	0.0.0.0 /
Subnet Mask (0.0.0.0 / 255.255.248.0)	0.0.0.0 /
Gateway (0.0.0.0 / 172.16.0.197)	0.0.0.0 /
Camera 1	http://172.16.5.24/cgi-bin/camera?resolution=640
Camera 2	
Camera 3	
Camera 4	
Camera 5	
Camera 6	

6. In the networking menu of the Cirrus CCD detector, add the cameras stream image **URL script** to the desired camera location (consult Section 10.8.3).
7. Re-power the Cirrus CCD detector, enter the engineer access code. Select the desired camera in the camera control menu. The camera will automatically connect, and the camera image will be displayed.

10.8.3 URL Script

Important Notice:

The Cirrus CCD detector only streams a live ‘still’ or ‘snapshot’ image feed directly to the display, the frame rate is determined by the camera. The feed is referred to as a static JPEG URL Script.

The URL script is different dependent upon manufacture and camera model.

Please contact the manufacturer of the camera to confirm their URL Script.

An example of one manufacture static JPEG URL Script is as follows:

http://<camera_IP_address>/snapshot.jpg

or

http://<camera_IP_address>/cgi-bin/camera?resolution=640

where <camera_IP_address> denotes the camera IP Address.

10.8.4 ProView used to Live Stream

Live steaming of cameras on the ProView software via TCP/IP connection to the Cirrus CCD detector can operate using a static JPEG URL Script or an MJPEG URL Script but please note the MJPEG will not operate directly on the LCD of the Cirrus CCD detector.

10.8.5 Camera Network Configuration

The network camera configuration is beyond the scope of this document and the individual camera manufactures documentation should be referenced.

10.9 Pipe Plan Image

The Cirrus CCD can display an image of the Pipe Plan.

Benefits of the function

The Pipe Plan image is an overview layout of the installed aspirating detection system installed. The Pipe Plan image is an optional feature.

Select the Pipe Plan icon to view the image diagram, if no image is installed, a pop-up message will appear: ‘no image available’. Touch anywhere on the screen to close the image.

Adding a New Pipe Plan Image

The Pipe Plan image should meet the following requirements:

File Size: 48kb maximum

File format: PNG

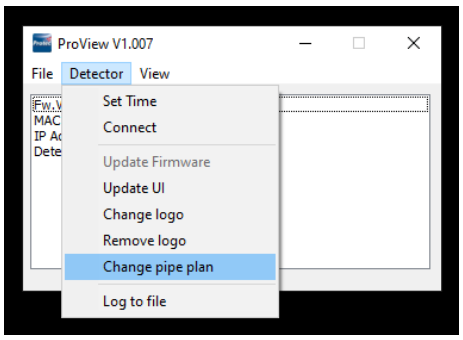
Resolution: 640x480; any smaller images will be centred, larger images will shrink to fit

If the image file size is over 48kb, it is recommended to remove any un-necessary colours and compressing the image using an image compression PC application.

10.9.1 Adding or Changing the Pipe Map Image

1. Open the PC software ProView.
2. Connect the USB cable [type A to type B] from the PC USB port [type A] to the Cirrus CCD USB port [type B] on the underside of the display cassette.

   A browser will automatically open connecting to the user interface, close the browser window.
3. Select the tab ‘Detector’, and then select ‘Change pipe plan’ from the drop-down list.



4. Open file > browse for the new Pipe Plan image file and open.
5. An error is displayed if the file size is over the maximum limit.
6. Once the detector has uploaded the image, remove the USB cable, and reboot the power to the detector.
7. Check the Pipe Plan image has been uploaded by selecting the pipe plan image icon.

11 Additional Commissioning Functions and Options for the Cirrus CCD using PC Software

The following section details the instructions for using the commissioning PC software tool: ProView.exe. Connecting to ProView enables additional features. For standard menu functions not listed in this Section please refer to the individual menus features in Section 10.

For ‘No Display’ models, all options listed in Section 10 can be accessed via the Proview PC software.

Follow the instructions to connect the detector to access the mirrored menus via a mirrored browser.

Although most options are commissionable via the touch screen display menu, the PC software offers a mirror menu with additional options including export and import of graph data and settings.

The use of a physical keyboard for ease of text editing can be an advantage during commissioning.

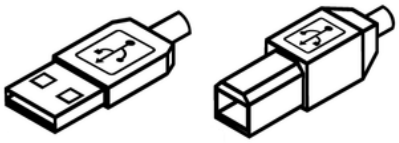
11.1 PC/Laptop Requirements

The PC used to connect to the Proview.exe must conform to the following minimum specification.

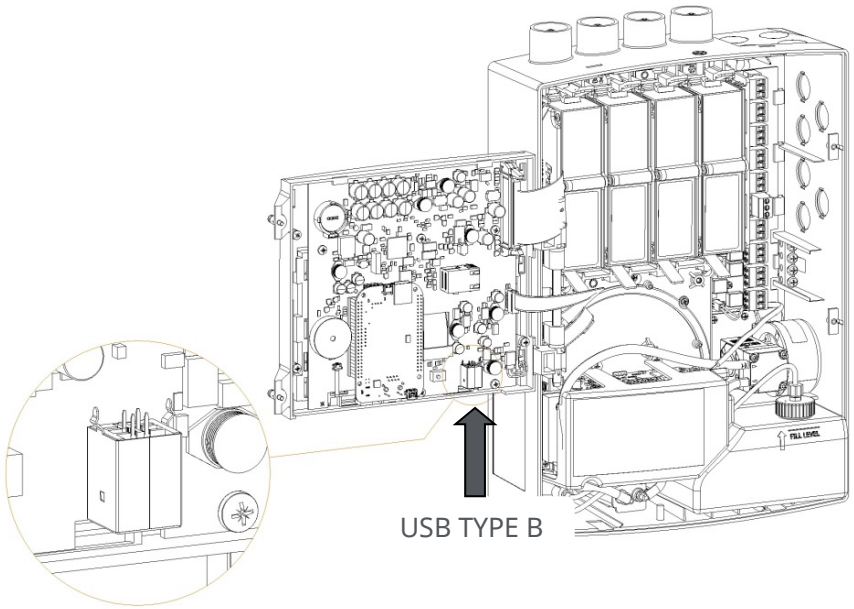
Item	Specification Requirements
Equipment	Protec Cirrus CCD detector
	USB cable (Type A male to Type B male)
	PC or Laptop
PC/Laptop	1 GHz Processor, 1 GB RAM, 200MB available disk space
	Windows® Operating System Windows® 7 or above (32 bit or 64 bit)
	Internet Browser Program (Recommended ‘Google Chrome’)
	USB 2.0 communication port
Software	ProView.msi

11.2 Connecting the Cirrus CCD to a PC or Laptop

1. Switch ON power to the detector.



2. Connect the USB cable [type A to type B] from the PC USB port [type A] to the Cirrus CCD USB port [type B] on the underside of the display cassette.



It is important the USB type A to type B cable is connected **after** the Cirrus CCD is powered because the detector will attempt to draw full power from the USB port. Likewise, to shut down the detector, first ensure the USB cable is disconnected.

11.3 Operating ProView

The windows application ProView provides the following features:

Set Time	Synchronise the time of the PC to the connected detector.
Connect	Opens connection of the detector's user interface in the default browser.
Update Firmware	Update the firmware software in the connected detector.
Update UI	Update the user interface software in the connected detector.
Change Logo	Import new logo/screen saver onto the connected detector.
Remove Logo	Remove and revert logo/screen saver to default.
Change Pipe Plan	Import a pipe plan image on to the connected detector. Consult Section 10.9.
Log to File	Log raw data from the connected detector to a .csv file.
Config View	Open and view exported detector settings.
Graph View	Open and view exported historic graphs.

11.3.1 Install ProView

1. Install the ProVeiw.msi follow the Windows installation instructions.

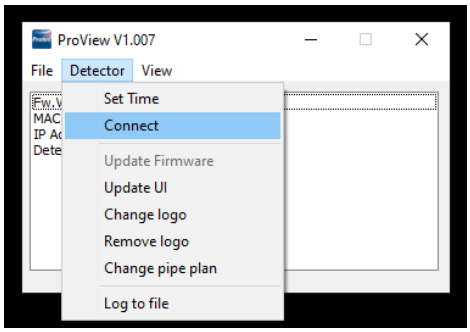
   Any previous versions of ProView must be un-installed prior to installing a new version.

2. Open ProView (Start menu > ProView).

   Providing the USB cable is connected to the Cirrus CCD detector the ProView software will automatically open the default internet browser.

   Protec recommends using 'Google Chrome' for the default browser.

   If the browser does not open, or fails to connect; within the ProView application, select the 'Detector' tab and click 'Connect'.



Using the browser, all options in Section 11 can be accessed via ProView. This can be used for 'No Display' models.

11.3.2 Change or Remove Screen Saver Logo

The Cirrus CCD default screen saver logo image can be changed to any image providing the following requirements are met;

File Size: 32kb maximum

File format: PNG

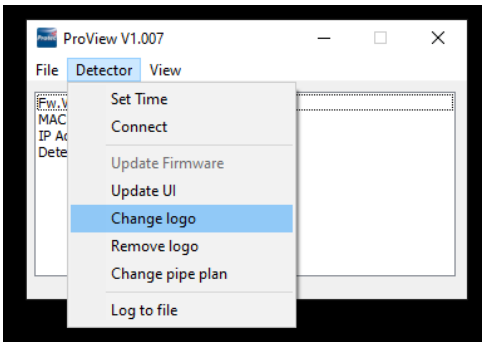
Resolution: 800x480; any smaller images will be centred.

If the image file size is over 32kb, it is recommended to remove any un-necessary colours and compress the image using an image compression application.

11.3.3 Changing the Screen Saver Logo Image

1. Open the PC software ProView.
2. Connect the USB cable [type A to type B] from the PC USB port [type A] to the Cirrus CCD USB port [type B] on the underside of the display cassette.

   A browser will automatically open connecting to the user interface, close the browser window.
3. Select the tab ‘Detector’, and then select ‘’Change Logo’ from the drop-down list.

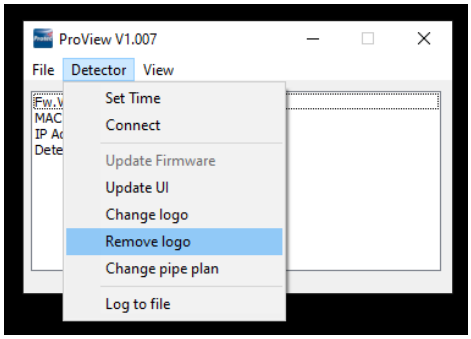


4. Open file > browse for the new image file and open.
5. Once the detector has uploaded the image, remove the USB cable, and reboot the power to the detector.
6. Check the screen saver logo image has been uploaded; ensure no faults on the detector and wait for the screen saver to appear (~2minutes). Do not touch the screen while waiting.

11.3.4 Removing the Screen Saver Logo Image

1. Open the PC software ProView.
2. Connect the USB cable [type A to type B] from the PC USB port [type A] to the Cirrus CCD USB port [type B] on the underside of the display cassette.

   A browser will automatically open connecting to the user interface, close the browser window.
3. Select the tab ‘Detector’, and then select ‘’Remove Logo’ from the drop-down list.



4. Check the screen saver logo image has returned to the default CCD logo; ensure no faults on the detector and wait for the screen saver to appear (~2minutes). Do not touch the screen while waiting.

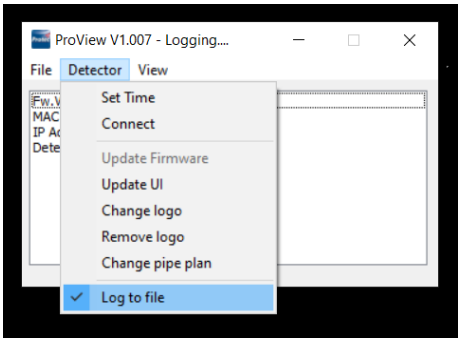
11.3.5 Record Detector Data Using Log to file

1. Open the PC software ProView.

2. Connect the USB cable [type A to type B] from the PC USB port [type A] to the Cirrus CCD USB port [type B] on the underside of the display cassette.

   A browser will automatically open connecting to the user interface, close the browser window.

3. Select the tab ‘Detector’, and then select ‘Log to file’ from the drop-down list.



4. The Log to file displays a tick when active. Select again to terminate the log.

5. Location of the logged file:

   C:\Users\[user_account_name]\AppData\Local\VirtualStore\Program Files (x86)\PFSG\ProView

6. Log to file data time stamps data every **2 seconds** (all data in analogue bits):

Cloud	Current cloud value	T4-1	Average CFS value from 1 min
Op	Current Optical value	Flev	Calculated CFS value
Oth	Initialise Optical background	FThr	Fire threshold (PA, F1, F2 & F3)
Co	Current Co value	Flag	Debug flag
Cth	Initialise Co background	Obs	Obscuration to convert to %/m
Hy	Calculated optical boost	AfAcc	Accepted airflow tolerances
Te	Raw Temperature value	OpT2	Optical averaged value
TTh	Initialise Temperature value	GAdj	Cloud gain adjust counter
Af	Raw airflow	RCount	Module reset counter
Cl	Raw Cloud value	ITime	SCD integration time
Cmin	Cloud minimum operating value	Raf	Raw airflow value
Cmax	Cloud maximum operating value	Chg	Gain change
Cbg	Initialise Cloud background	CErr	Cloud error counter

The 'Log to File' method of recording data can be particularly useful for live fire testing due to the increased frequency of the recorded values when compared to the Historic particle data graph.

The 'Log to File' information recorded in Excel format can be converted to graph format in Excel for presentation purposes.

11.3.6 Loading the Firmware

To update the Cirrus CCD with a new version of firmware perform the following instructions:

1. Turn **off** the power supply to the Cirrus CCD detector. The detector must be switched off when loading the firmware.

2. Run ProView and connect the USB cable from the PC to the Cirrus CCD.

3. The ProView.exe window console will display ‘Connected to bootloader’.

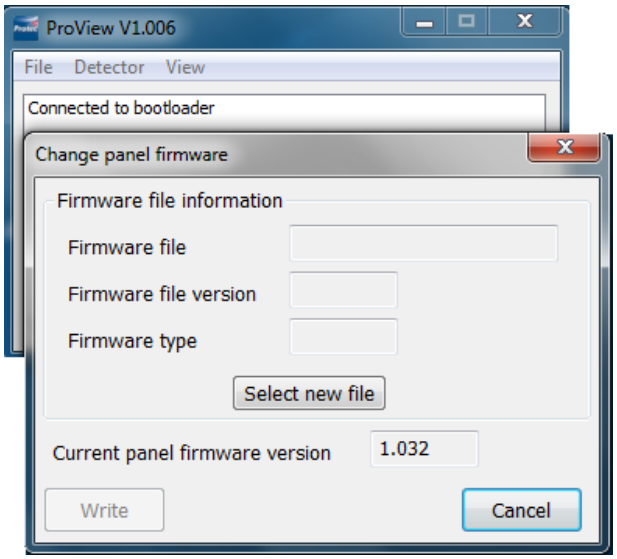
4. Select ‘Detector’ tab and select ‘Update firmware’.

5. Select the ‘Select new file’ button, browse for the required new firmware file (.hex).

6. Select the ‘Write’ button to start the transferring the firmware.

7. Once complete, disconnect the USB cable.

8. Turn ON the Cirrus CCD and check the commissioning settings are correct i.e., fire thresholds, day and night timings, airflow values etc.



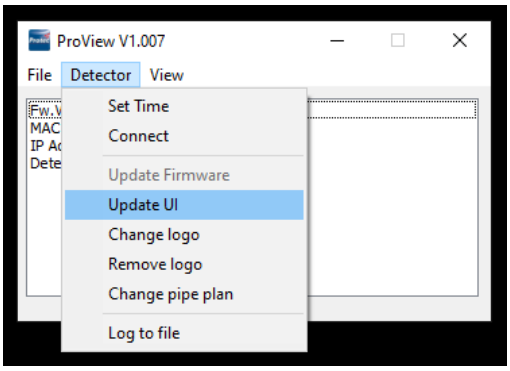
11.3.7 Loading the User Interface

To update the Cirrus CCD with a new version of user interface software perform the following instructions:

1. Run Proview and connect the USB cable from the PC to the Cirrus CCD.

   Close any web browsers that open automatically.

2. Select ‘Detector’ tab and select ‘Update UI’.



3. Browse for the desired user interface file (.iff).

4. Once selected the file will be transferred to the detector, but not displayed until the system has been rebooted.

5. Reboot power to the detector this will instigate a re-load of the new user interface.

11.3.8 Download and Upload the Detector Settings

The detector settings including alarm thresholds, commissioning data, IO settings etc, can be retrieved from the detector for either (a) backup/reference or (b) to upload the settings into another detector of the same type.

Create a copy of the detector settings and transfer these settings into another detector can save time during commission, especially if the time-zone (day and Night mode) is enabled.

11.3.9 Download settings to file.

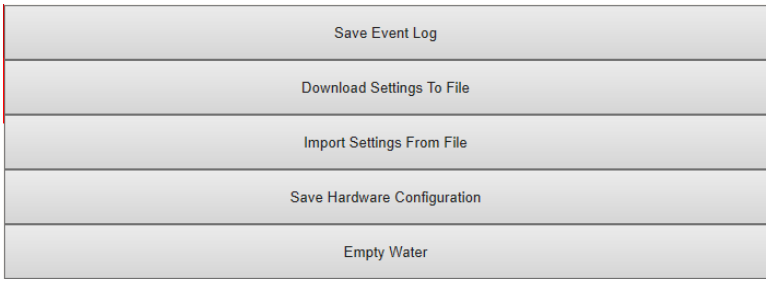
1. Open the PC software ProView.

2. Connect the USB cable [type A to type B] from the PC USB port [type A] to the Cirrus CCD USB port [type B] on the underside of the display cassette.

   A browser will automatically open connecting to the user interface, close the browser window.

3. Login using the access level code, refer to Section 9.3

4. Select the advanced option page, refer to Section 10.4.



5. Select ‘Download Settings to File’ from the list.

   The settings will be copied from the detector and saved to the local downloads folder.

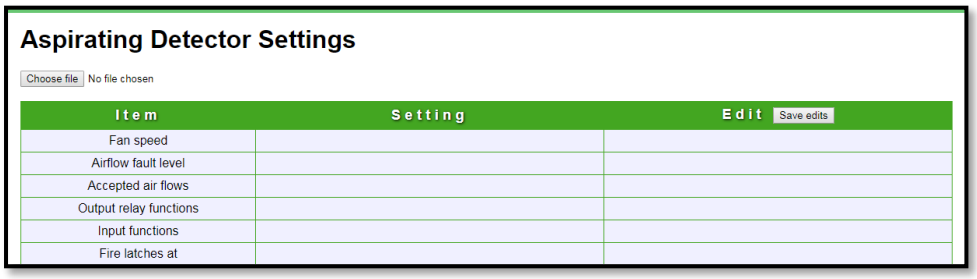
   The file is saved as a text document: setttings.txt.

11.3.10 Open, View and Edit the detector settings

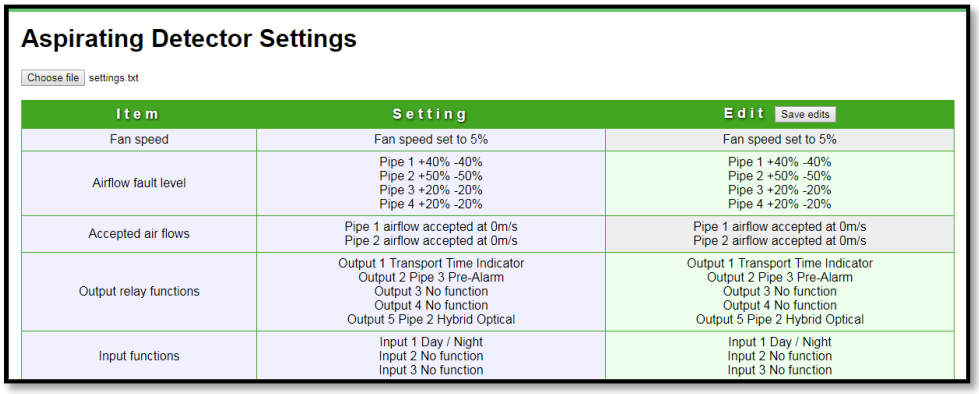
1. Open the PC software ProView.

2. Select the ‘View’ tab, and the select ‘ConfigView’ from the drop-down list.

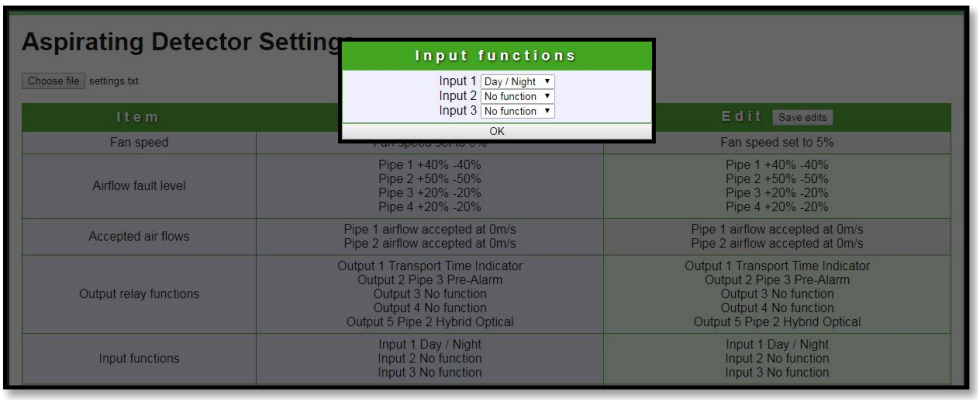
3. The browser window will open. Select ‘Choose file’ and browse for the detector settings file saved as file type ‘text document’ and open.



4. The settings will be displayed within the browser.



5. Select the setting in the edit column that require changing and edit as necessary.



6. When finished editing press ‘Save edits’ at the top of the edit column.

7. The edited file is saved as a TXT file in the local downloads folder.

11.3.11 Restore settings/Upload settings into an alternative detector

1. Open the PC software ProView.

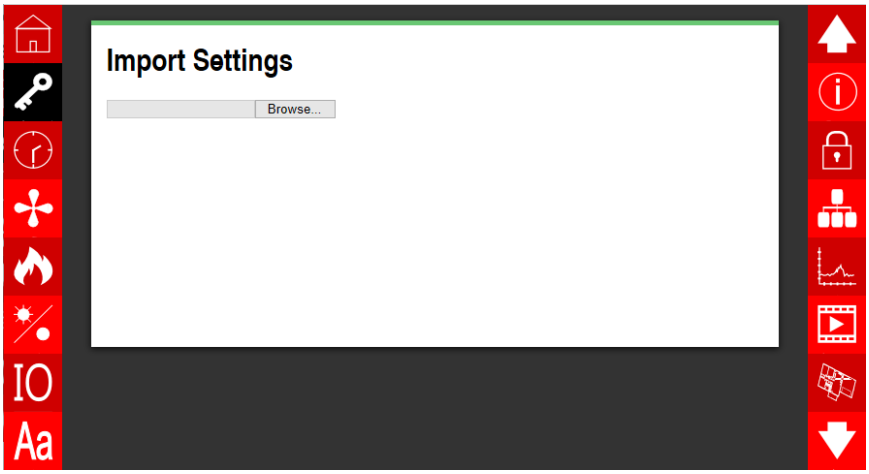
2. Connect the USB cable [type A to type B] from the PC USB port [type A] to the Cirrus CCD USB port [type B] on the underside of the display cassette.

   A browser will automatically open connecting to the detector's user interface.

3. Login using the access level code, refer to Section 9.3

4. Select the advanced option page, refer to Section 10.4.

5. Select 'Import Settings From File' from the advanced option list.



6. Open file > browse for the settings file saved as file type 'TXT file' and open.

7. Once the import is finished the screen will return to the advanced options menu.

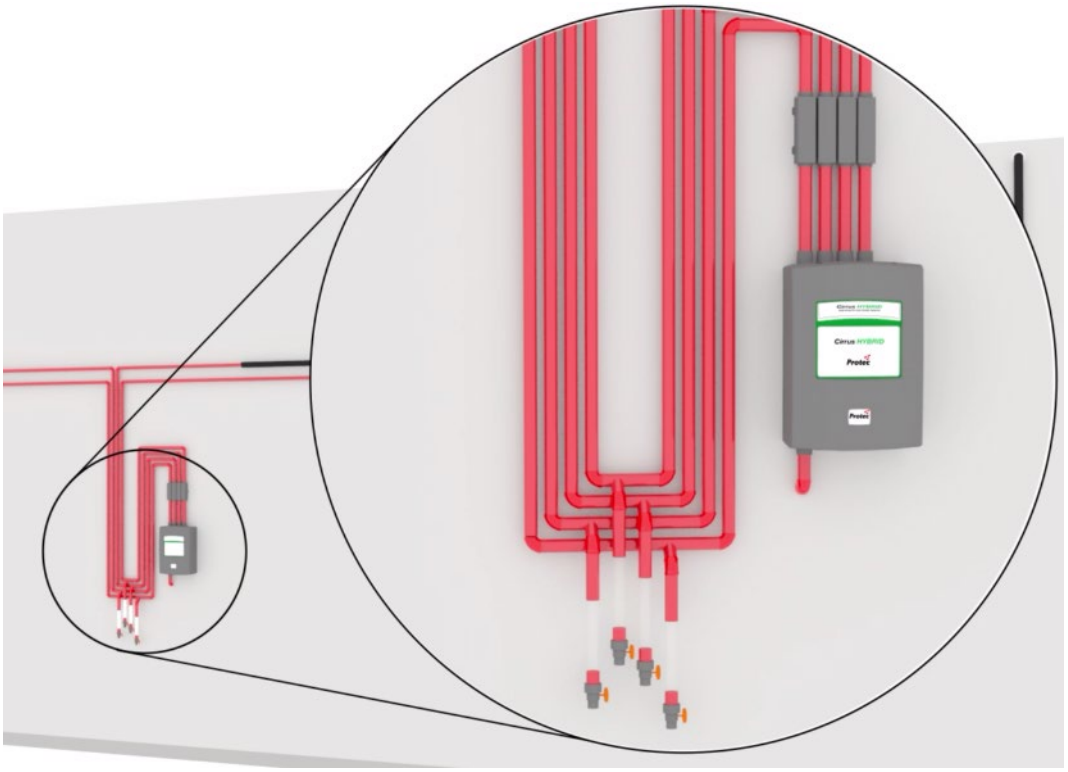
8. Remove the USB cable.

Restoring uploaded data should be confirmed as correct for the actual application.

12 General Design Guidelines for Cold Store Applications

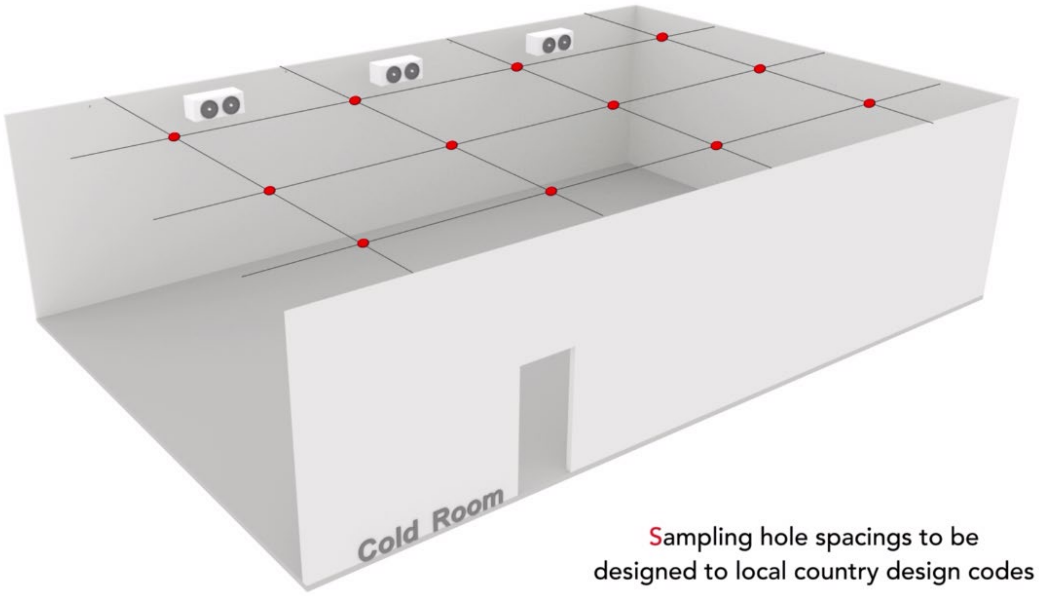
The following instruction are recommendations on protecting cold storage refrigerated warehouses using Cirrus CCD aspirating fire detector. Testing of many completed installations have proved that Cloud Chamber Detectors are an excellent solution to provide early warning fire detection in this extreme environment.

The Cirrus CCD detector must only be installed OUTSIDE of the cold store room in a 'normal temeperature' ambient area typically +5^{0}C to +25^{0}C. Additionally there should be easy and safe access for future service engineer visits.

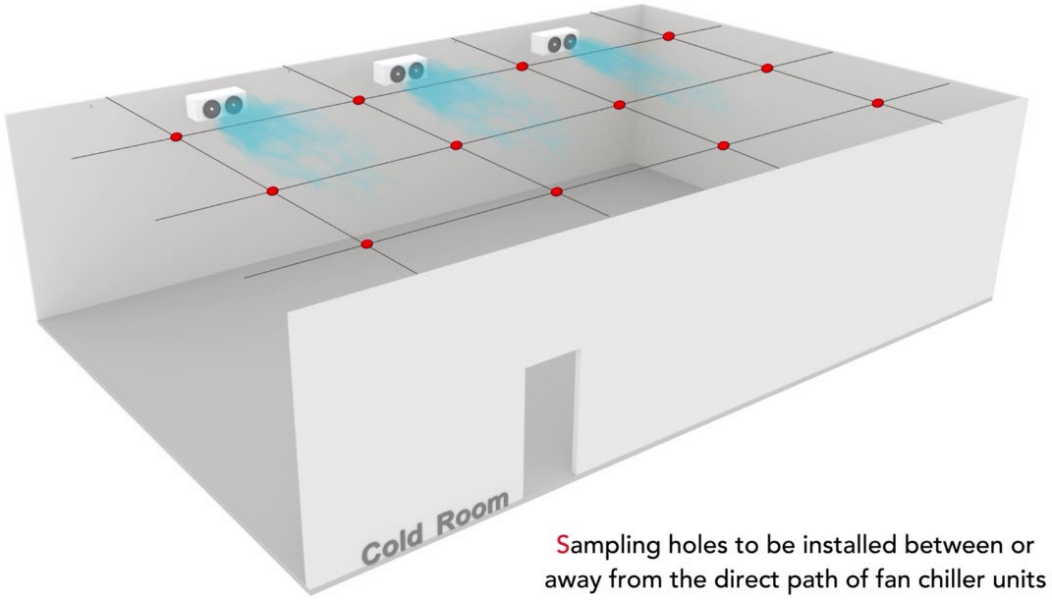


For cold store applications it is recommended the installation of sampling pipe condensation traps on EACH sampling pipe. These should be designed in a manner similar to the above, where any moisture within the sampling pipe would be directed to the condensation trap through gravity, as the trap is located at the lowest point of the sampling pipe installation.

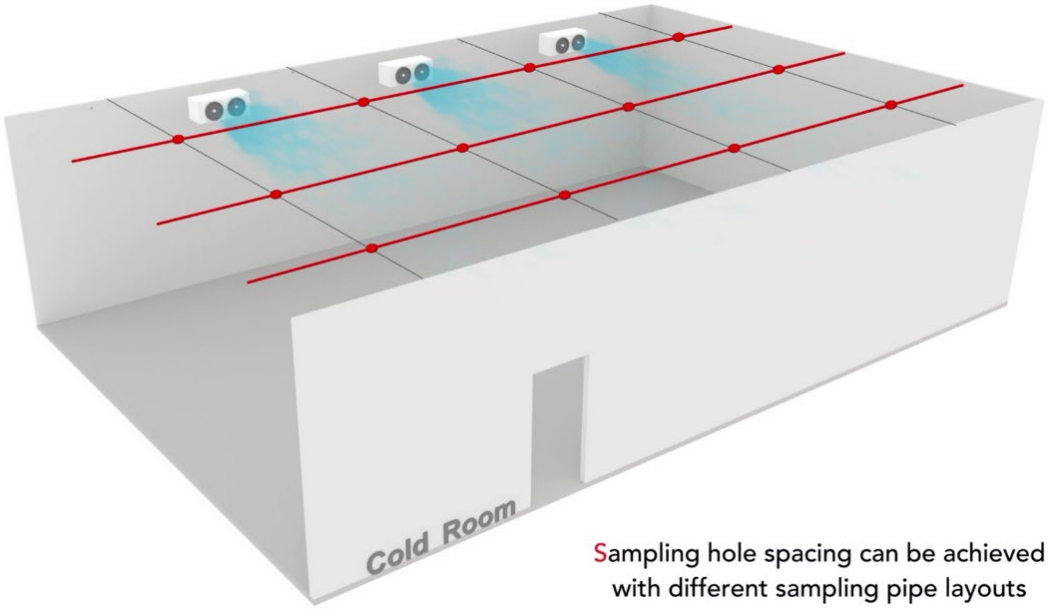
These and other designs of condensation traps should allow the removal of excess condensation manually or automatically, however these should remain airtight in normal operation.



The designer should arrange the sampling pipe and sampling hole array in accordance with the local country design code with specific reference to the area of coverage per sampling point and the room height.



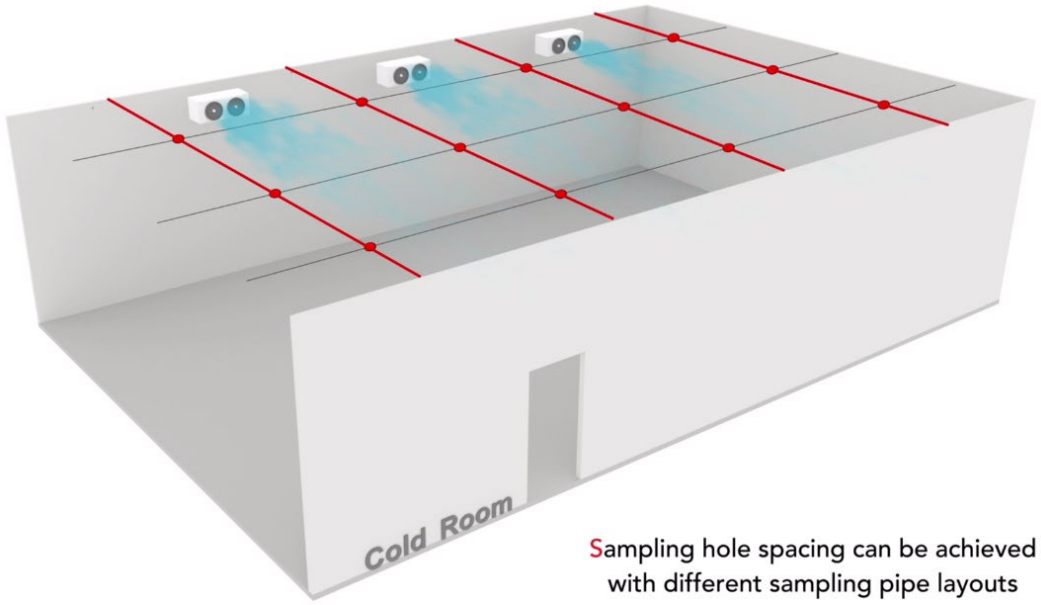
The designer **must** ensure that no sampling hole locations are configured in the direct line of the supply air from the fan chiller units. The air temperature in the areas around the fan chiller units can be around 20^0C cooler than the general room temperature and the forced air cooling can restrict the aspirating detection system performance. Likewise, no sampling holes must be designed close to an access door where air of different temperatures, from an adjoining area, could enter the cold store. These areas are prone to ice build-up on the ceiling and are areas where sampling holes could become restricted or blocked.



Sampling hole spacing can be achieved with different sampling pipe layouts

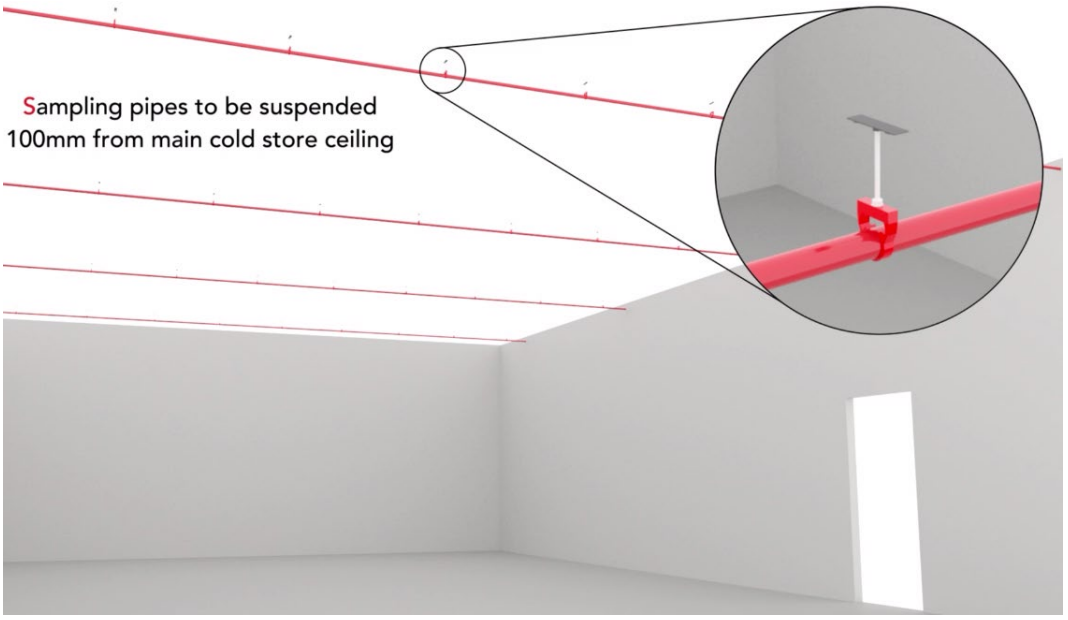
Pipe runs may be configured in a number of orientations with regards to the room layout, as per the details shown above and below. These pipe configurations must all comply with the restrictions highlighted on the previous pages, with regards to the sampling hole locations.

The designer should be aware of and make provision for the quantity, location, and functionality of the fan chiller units (including de-frost cycles).

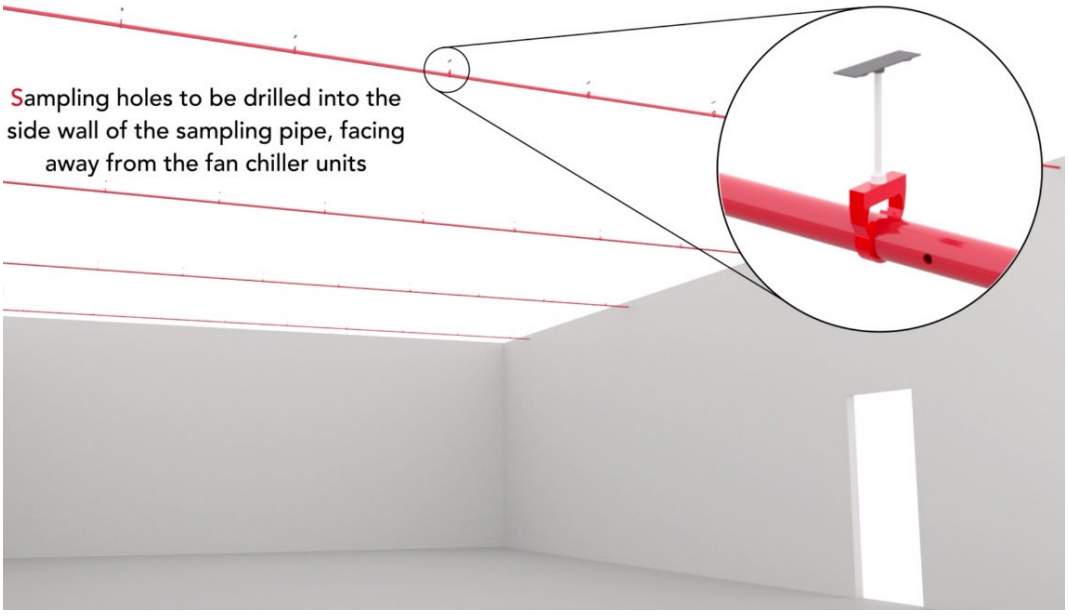


Sampling hole spacing can be achieved with different sampling pipe layouts

Only sampling pipe suitable for the specified operational temperatures of the cold store should be used. Typically, ABS sampling pipe has an operational temperature range of -40 °C to + 70 °C and is regularly used for cold store aspirating systems applications. A number of metallic pipes are suitable for cold store applications however, it is the designer's responsibility, to confirm suitability of the pipe and any pipe accessories (sockets, bends, tee's etc.) for these applications. All metallic pipe installations should be suitably electrically grounded. PVC and CPVC pipe should not be used for cold store applications.

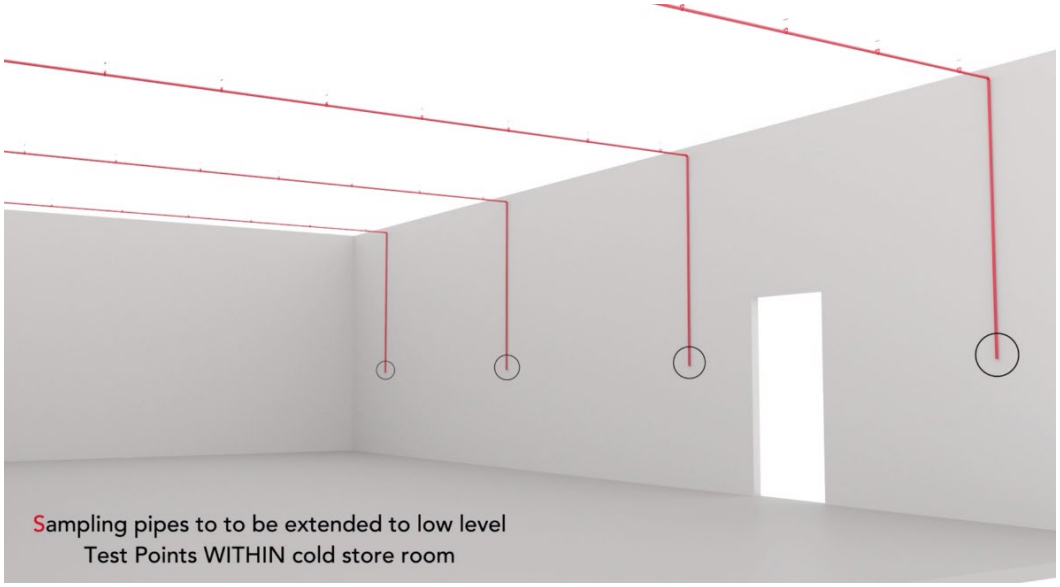


It is recommended the complete sampling pipe installation be installed approximately 100mm from the main cold store ceiling. This is to prevent sampling holes becoming restricted or blocked in areas of ice build-up and is usually carried out utilising a system of nylon screwed drop rods or similar. If the pipe installation is carried out prior to the cold store reaching operational temperature, then allowance will need to be made for any contraction of the sampling pipe due to the temperature reduction. This could require the main room sampling pipes be left disconnected from the outside installation, then fully connected, and sealed when the cold store is at operating temperature.

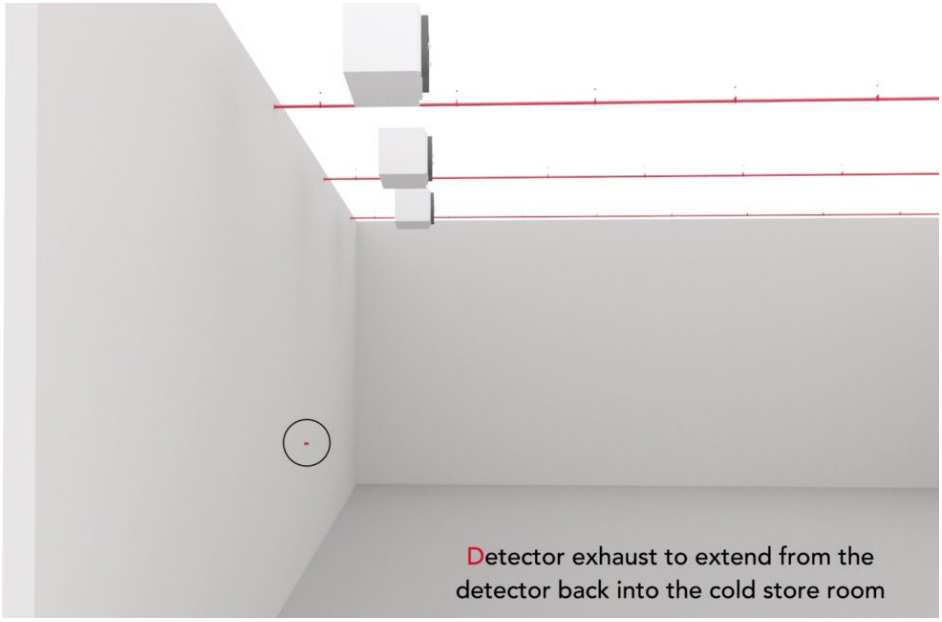


All sampling holes within the cold storeroom should be drilled on the side wall of the sampling pipe. Should condensation form on the inside the sampling pipe and subsequently freeze, any sampling holes drilled on the underside of the sampling pipe would likely become restricted or blocked.

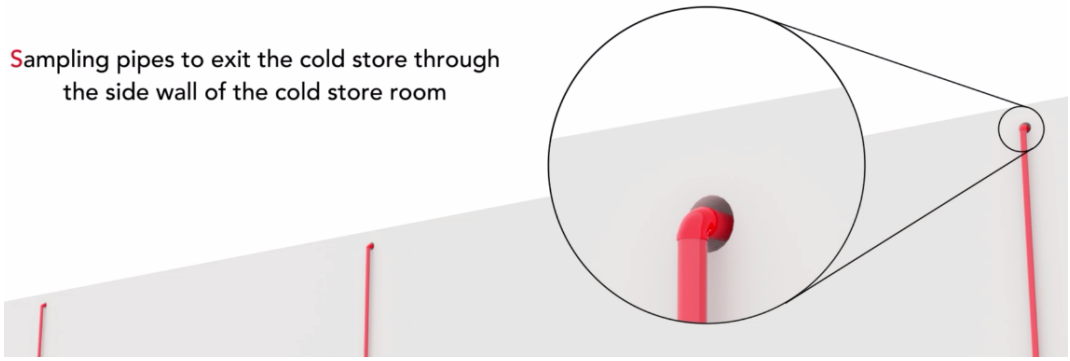
The designer should be aware of and make provision for, the specific positioning and orientation of sampling holes on the sampling pipes, to ensure these are unaffected by any Venturi Effects that may be created by the operation of fan chiller units.



Sampling pipe Test Points should be installed after the final sampling hole, in a location accessible for service engineers and importantly **within** the cold storeroom. If test points are installed outside of the cold storeroom ambient air, of a much higher temperature, is likely to enter to the sampling pipe, condense and create ice within the pipe installation.

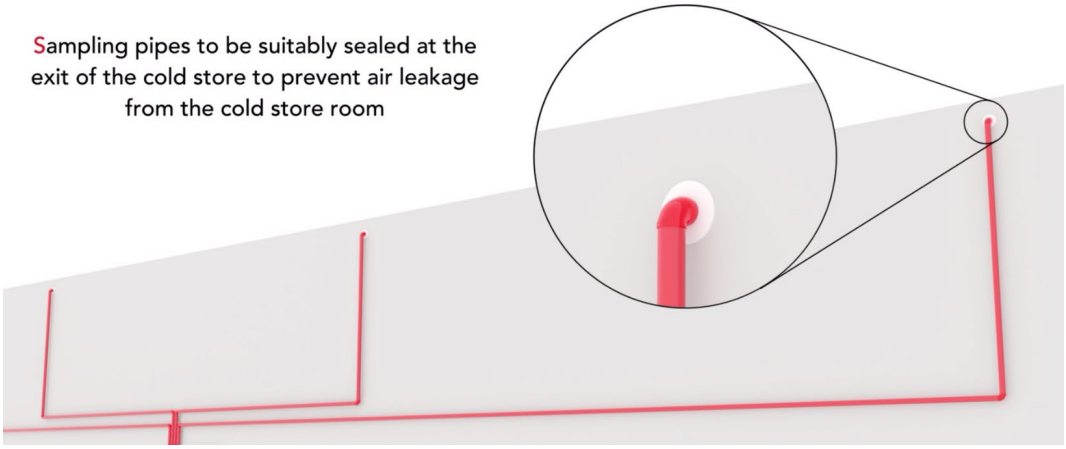


It is a requirement for **all** cold storage applications that the aspirating detector exhaust pipe be returned to, and be terminated within, the actual cold storeroom. This should allow any pressure differentials between the cold storeroom and the location of the aspirating detector to be equalised.

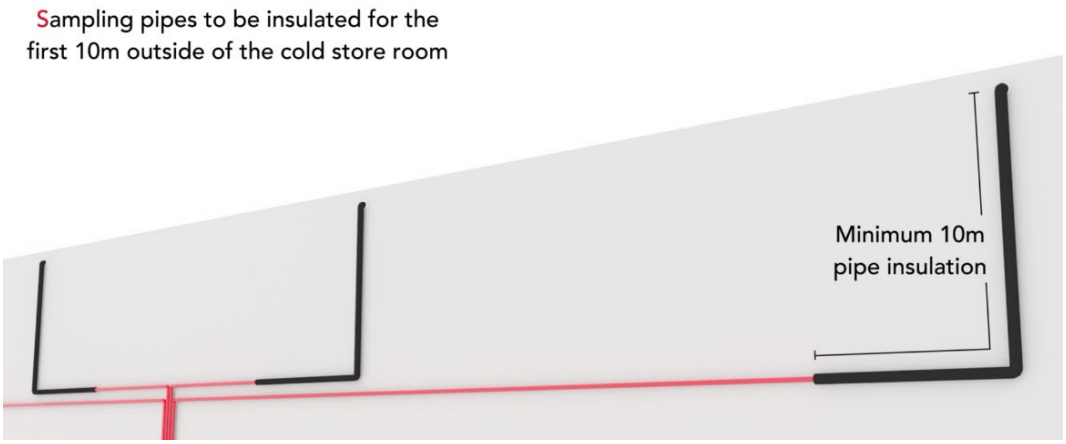


It is **not** recommended sampling pipes be taken through the ceiling of the cold store. This method can create locations within the sampling pipes where moist air condenses, falling back towards the ceiling exit point and freezing, thereby potentially restricting, or blocking sampling holes.

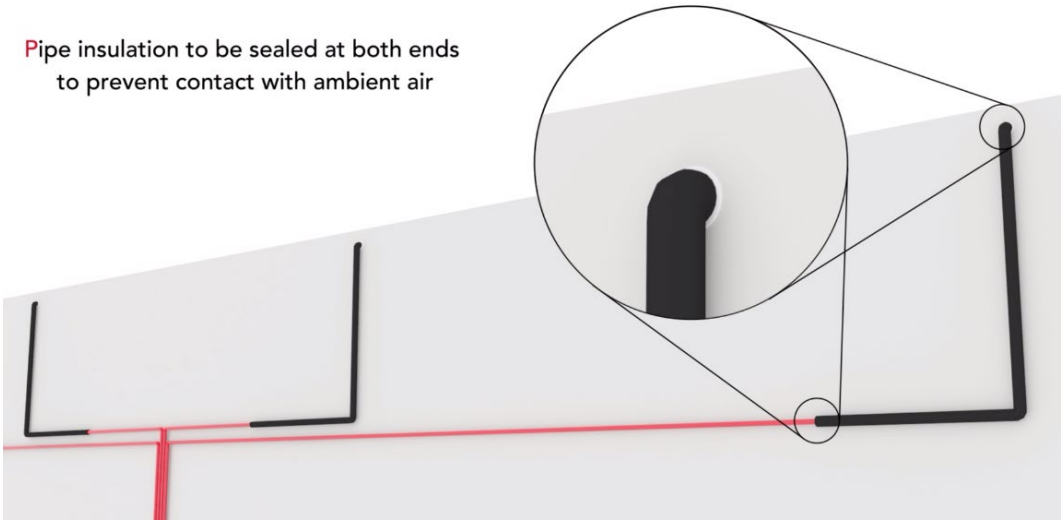
It is **not** recommended the installation of capillary sampling points in cold store applications. Again, any condensation created in these smaller diameter capillary tubes are potential locations for the creation of ice, thus restricting or blocking sampling holes.



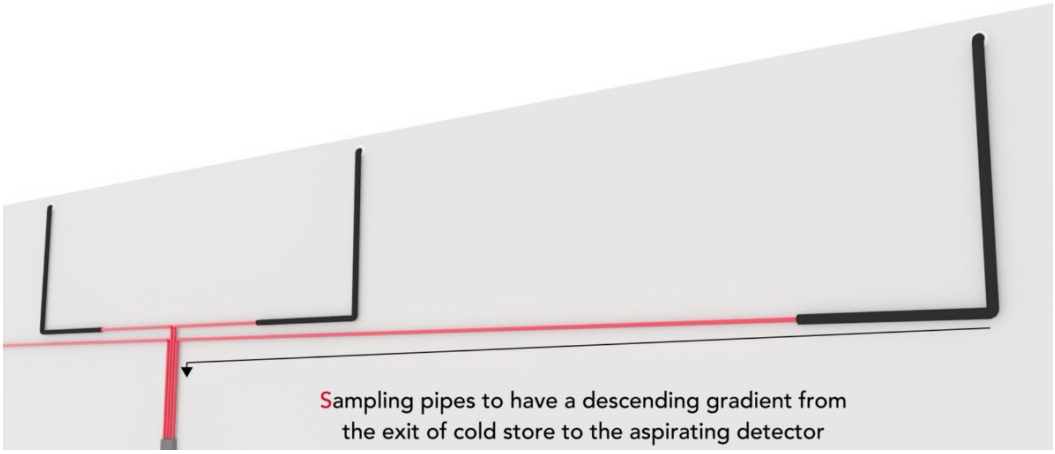
Where sampling pipes exit the cold store fabric wall, all penetrations shall be ‘suitably sealed’ to prevent any air leakage from the cold storeroom. Where air from the cold storeroom is allowed to seep through any unsealed openings, the air will condense and freeze to create a ‘block of ice’ around the opening. As these blocks of ice increase in size through time, they will themselves condense on their exterior surfaces and create many drops of condensation and ultimately pools of water on the area below.



It is recommended that each sampling pipe is insulated from the pipe exit point of the cold store, for a minimum of 10 m. This insulation is not, and does not, assist with heating the sampled air. The insulation is provided to prevent ambient air touching the very cold surface of the sampling pipe, as this will create condensation which will then freeze, resulting in ice build-up around the sampling pipe.



Where this pipe insulation is installed, it is a further requirement, that where the pipe insulation meets the cold store wall and where the pipe insulation stops, that a suitable sealant is applied, to prevent ambient air touching any cold surface.



It is recommended that each sampling pipe has a descending gradient from the exit of the cold storeroom to the location of the sampling pipe condensation traps and aspirating detector. This will allow any moisture formed in this part of the pipe installation to fall via gravity to the condensation traps.

12.1 Possible Temperature Variations within the Cold Storeroom

Generally speaking, most cold store rooms are kept at a controlled and constant temperature, usually between -18 °C and -25 °C. The only temperature variation in these types of cold store, is where the fan chiller refrigeration units are operating, and where these are in their de-frost mode cycles. This therefore allows little, if any moisture to be present within the cold store room and allows a stable environment for the aspirating detection system.

However, some cold store applications can, for various reasons, have planned temperature changes. Reasons for this could include seasonal use of the cold store room, different products stored within the cold store rooms at different times and electrical power savings when the cold stores are not being utilised.

These applications can create potential problems within the aspirating detection system and careful thought by the designer should be given to the overall solution provided. Potential problems could include, increased moisture in the air when the cold store temperature is raised, which in-turn can create ‘icing’ issues when the cold store is taken down to operational temperature in the future. If fan chiller units are not used for significant time periods this could change the airflow dynamics within the cold store room, and possibly lead to airflow faults from the aspirating detector.

The designer should also consider that if the cold store room temperature is likey to change for any of the above reasons, that this may have an adverse affect on the sampling pipe installation with regards to pipe expansion and contraction. One option to allow for these physical changes could be to install expansion joints at regular intervals within the pipe installation.

13 TCP/IP Connection

The Cirrus CCD is capable of connecting to a LAN network.

Benefits of function

The IP network feature enables the access to the Cirrus CCD menu system remotely. Therefore monitor, control and programming can be performed via the IP connection.

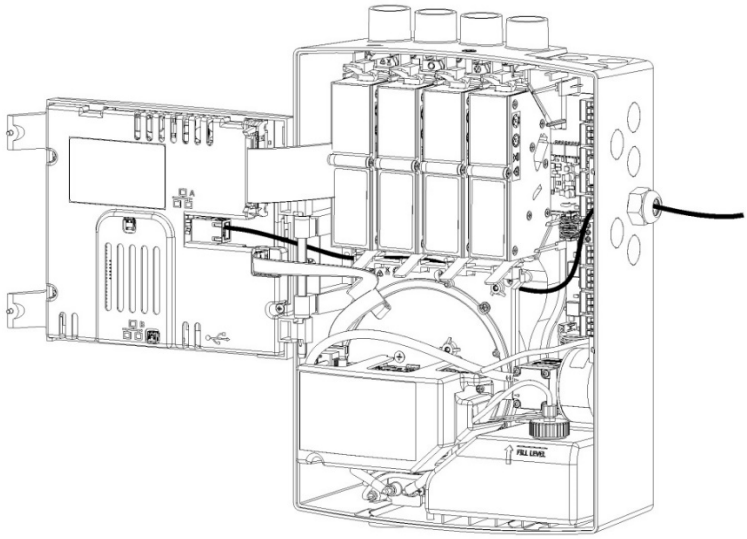
Additionally, the IP connection enables access to the Protec graphics system ‘Hercules’, again creating a single remote access point of all connected detectors on a secure graphical application. Consult the Hercules manual for further details.

To enable the remote access connections, consult Section 10.8 and enter the network information: IP address, Subnet Mask and Gateway.

Once enabled, test the connection.

13.1 Connection and routing the network cable

When the network is connected permanently the cable must be routed from the socket between the hinge arms and under the fan housing/AFS clips.



13.2 Test the connection

1. Connect the PC/network display to the local network.
2. Open the web browser application program.
3. Type the Cirrus CCD’s IP address into the browser address bar.
4. The PC/network display will now connect to the Cirrus CCD detector.

14 Faults

The Cirrus CCD constantly monitors operational performance to ensure the detector is functioning within its correct parameters. If the Cirrus CCD suspects a fault the buzzer will sound, the fault LED will illuminate and one or more of the following faults will be displayed within the system status menu.

14.1 Fault 1 - Device Missing Fault

<table>
<tr><td>Fault Text</td><td colspan="2">Pipe 1 Device Missing
Pipe 2 Device Missing
Pipe 3 Device Missing
Pipe 4 Device Missing
Cloud Chamber Device Missing
Scanning Unit Device Missing</td></tr>
<tr><td>Description of fault</td><td colspan="2">A communication problem to a device within the detector has been identified or a device has been removed from the detector.</td></tr>
<tr><td colspan="2">Identify the problem</td><td>Action</td></tr>
<tr><td colspan="2">Pipe 1 to 4, AFS module:
• AFS not positioned in socket correctly.
• Damaged or loose connection from the 40-way ribbon cable.</td><td>• Push the AFS firmly into the socket location. Ensure the top and bottom clips fully engage and latch.
• Inspect the cable for damage, replace if necessary. Push the 40way ribbon cable firming in the socket, ensuring it is connected at both ends.</td></tr>
<tr><td colspan="2">Cloud Chamber and Scanning Unit module:
• Module not powered.</td><td>• Check the power LED is illuminated on the PCB, if not check the 10way ribbon cable is connected at both ends and inspect of condition of the cable for damage.</td></tr>
<tr><td colspan="3">If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.</td></tr>
</table>

14.2 Fault 2 - Device Added Fault

Fault Text	Pipe 1 Device Added Pipe 2 Device Added Pipe 3 Device Added Pipe 4 Device Added Cloud Chamber Device Added Scanning Unit Device Added
Description of fault	A Cirrus CCD device has been added to the detector, but the detector has not been commissioned to enable the device.

Identify the problem	**Action**
New device fitted within the detector not commissioned.	Engineer access level code required. Select the 'information' menu, scroll down to the option 'Save Hardware'. The device will not detect fires until the hardware configuration has been saved, consult Section 10.4.
If saving the hardware configuration does not resolve the fault, contact Technical Support or your local distributor for assistance.	

14.3 Fault 3 - Airflow Fault

Fault Text	Pipe 1 Airflow Fault Pipe 2 Airflow Fault Pipe 3 Airflow Fault Pipe 4 Airflow Fault
Description of fault	The airflow reading has moved out of the accepted fault tolerance range due to either an increase or decrease in airflow. Select the quick navigate airflow icon to view the current airflow value. At the time of commissioning when the pipe configurations are complete the airflow reading must be zeroed. The Cirrus CCD normalised its airflow to the current m/s reading to these zeroed values. If the airflow has drifted out of the fault tolerance range an airflow fault is generated.

Identify the problem	**Action**
Increase in airflow reading, check: • Detached sampling pipe. • Blower damaged/malfunctioning.	• Locate and repair. • Replace component.
Decrease in airflow reading, check: • Dirty in-line filter. • Dirty AFS filter/s. • Blocked sampling pipe. • Blocked sampling hole. • Blower power connector removed. • Blower damaged/malfunctioning. • Not zeroed correctly during commissioning.	• Carefully clean or replace in-line filter. • Carefully clean AFS filter. • Locate and remove blockage. • Locate and remove blockage. • Re-connect providing in suitable condition. • Replace component. • Re-commission airflow, ensure adequate settling time allowed.

Also consider,

- The airflow was not correctly zeroed during commissioning, ensuring adequate settling time, recommend 5 minutes.
- Environmental conditions have altered since commissioned. For example, open doors, shutters or windows can cause a change in pressure creating a change in airflow values.

Recommendations

After identifying the problem make the appropriate action to resolve.

Where replacements are necessary contact Protec Technical Support or your local distributor.

It may be necessary to zero the airflow readings dependant on the change made to the aspirating pipe network and /or the detector.

Confirm the detector is functioning correctly by performing a fire test and verifying the transport time.

The airflow monitoring of any pipe can be ignored by checking the relevant ‘Ignore’ box found in the airflow menu screen. Enabling this feature will generate an ‘Airflow Ignored’ fault. This feature can be used when diagnosing intermitted airflow changes.

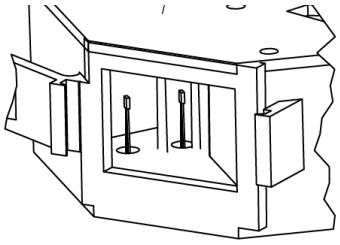
14.4 Fault 4 - No Water Fault

Fault Text	No Water Fault
Description of fault	The cloud chamber's water reservoir is empty.

Identify the problem	**Action**
No visible water in bottle. No visible water in chamber/tubes while filling. Visible water in chamber.	Re-fill water supply (distilled water only), a fill will occur within 6 hours. Water fill path blocked, remove blockage where possible. PCB damage/malfunctioning. Replace the cloud chamber.
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.5 Fault 5 - Airflow Out of Range

Fault Text	Pipe 1 Airflow Out of Range Pipe 2 Airflow Out of Range Pipe 3 Airflow Out of Range Pipe 4 Airflow Out of Range
Description of fault	The airflow range has moved outside the minimum or maximum range. The minimum acceptable airflow is 0.5m/s. The maximum acceptable airflow is 6.0m/s. Select the quick navigate airflow icon to view the current airflow value.

Identify the problem	**Action**
To identify the cause of the problem, follow instructions for 'Fault 3 – Airflow Fault'. If the airflow has exceeded 6.0m/s it is possible the corresponding airflow sensor has failed, the AFS will require replacement. Ensure thermistors are positions correctly, remove the AFS and the bottom mesh filter to inspect the thermistors. 	
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.6 Fault 6 - Seal Fault

Fault Text	Cloud Chamber Seal Fault
Description of fault	The cloud chamber checks for small ‘pressure leaks’ during each air sampling cycle. The seal fault does not necessarily stop the detector from functioning, but it must be attended to before further potential failure.

Identify the problem	**Action**
• Fixing screws have become loose. • Tube barbs have become loosen. • Damaged tubes. • LED/Photodiode o-ring missing or damaged.	• Tighten LED screws (0.6Nm-0.8Nm). • Tighten PCB screws (0.6Nm-0.8Nm). • Tighten LID screws (0.6Nm-0.8Nm). • Tighten tube barbs where possible. • Inspect the tubes for damage. • Carefully remove the LED & PCB to locate each o-ring seal and inspect for damage. Upon each action restart the detector to clear fault.
• Loose/damaged/malfunctioning valve. • Internal leak/blockage.	• Replace cloud chamber.
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.7 Fault 7 - Vacuum Fault

Fault Text	Cloud Chamber Vacuum Fault
Description of fault	The cloud chamber checks for large ‘pressure leaks’ during each air sampling cycle. Large leaks potentially can mean insufficient vacuum to form a cloud.

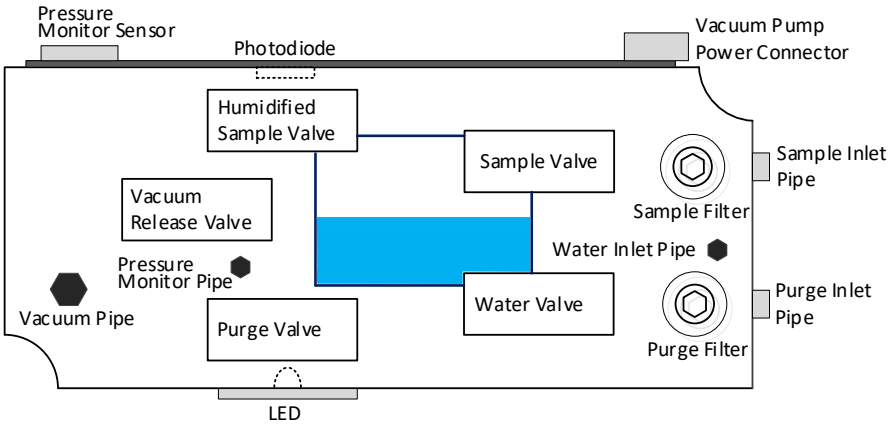
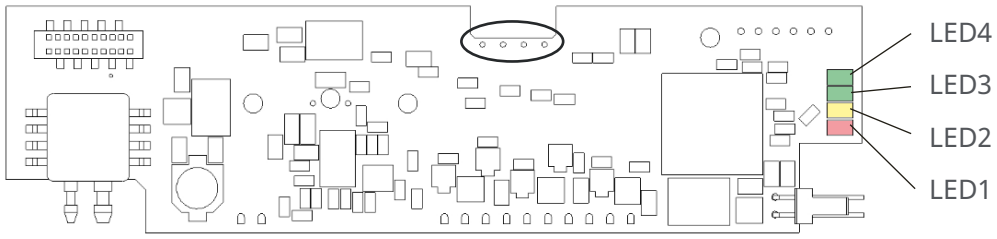
Identify the problem	**Action**
Pressure sensor: • Check the pressure sensor tube from the cloud chamber to the pressure sensor on the PCB.	• Check and reconnect tube, ensure a firm connection.
Vacuum pump: • Check power connection to the pump. • Check the pump operates. • Check Vacuum tube from the pump to the cloud chamber.	• Inspect all connections for damage. • Replace pump. • Check and reconnect tube, ensure a firm connection.
Valves: • Inspect the valve wires are soldered and have no dry joints. • Damage/blocked/malfunctioning valve.	• Resolder the wires where necessary (trained, authorised personal only). • Replace cloud chamber.
• Internal leak/blockage.	• Replace cloud chamber.
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.8 Fault 8 - Cloud Chamber LED Fault

Fault Text	Cloud Chamber LED Fault
Description of fault	The detector has reported insufficient light is being received at the photodiode.

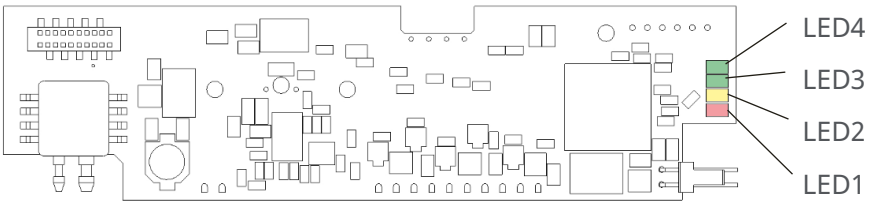
Identify the problem	**Action**
• Check the LED wires are not damaged. • Check the LED wires are soldered with no dry joints to the Cloud Chamber circuit board. • Check the chamber LED brightness, consult Section 10 Site, Manufacturing, Service Information and Event Log; if the current LED brightness readout is >99% follow action.	• Replace LED assembly. • Resolder the wires where necessary (trained, authorised personal only). • Remove LED and carefully clean. If the fault persists, replace the LED assembly.
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.9 Fault 9 - Water Fill Fault

Fault Text	Cloud Chamber Water Fill Fault
Description of fault	The detector has reported the water fill level is out of range. The Cloud Chamber and Pump will halt operation until the water level has returned to normal. This operating is a safeguard to prevent the water from flooding the internals of the Cloud Chamber. Typical (normal) water level:  Cloud Chamber Circuit Board (WEFA476): 

Identify the problem	**Action**
• Visually check the water level, if the water has risen above 3/4 of the water chamber volume follow the corresponding action.	• Attach a syringe to the 'water inlet pipe' connector, using a tool with a 1mm point, push and hold the manual valve button on the water valve (located on the top of the valve). Pull the water out of the chamber using the syringe, monitoring LED3, once LED3 is no longer illuminated, the chamber and pump will begin to operate again. • Remove the syringe and attach the water inlet tube to the water bottle, visually inspect the tube during an air sampling cycle. Ensure no water is pulled into the pipe, if it does, replace the cloud chamber.
• Check circuit board soldered joints (circled above) and ensure no dry joints. • Check the water sensor circuit board is attached. It must be in contact with the rear of the cloud chamber.	• Resolder the joints where necessary (trained, authorised personal only). • Carefully tighten the screw ensuring the water sensor circuit board is flush to the chamber wall.
• Ensure the detector is mounted vertically.	• Position and mount the detector vertically, with no sloping.
If the Cloud Chamber Calibration Fault is also displayed, consult Fault 37 for further details.	
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.10 Fault 10 - Water Consumption Fault

Fault Text	Cloud Chamber Water Consumption Fault
Description of fault	The detector has not successfully drawn water for the number of days set in the service information menu (default 30 days), refer to Section 10.1.5.  Cloud Chamber Circuit Board (WEFA476)

Identify the problem	**Action**
• No visible water in the bottle. • Obstruction in water pipe. • The detector has been switched off and the 'number of days' have expired. • Or, the detector time was incorrect during the last water fill, and has been set correct since, causing the 'number of days' to expire. • The clock battery is discharged/flat and therefore during a power cycle the time will be reset to default. Corrupting the time logs within the water fill memory.	• Re-fill water supply (distilled water only). • Inspect the water pipe and clear any blockage. • In order to force the cloud chamber to fill, first remove water by connecting a syringe to the water inlet pipe, pressing the manual valve release on the water valve, and drawing the water out using the syringe. The water level is sufficiently low when LED4 is turned off. • Re-connect the water bottle to the water inlet. Re-boot the detector, the cloud chamber will begin the water fill cycle. • Measure the clock battery, ensure the Voltage is above 2.5 V dc, otherwise replace.

If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.

14.11 Fault 11 - Sample Fault

Fault Text	Cloud Chamber Sample Fault
Description of fault	The detector has reported the cloud chamber air sample route is blocked.

Identify the problem	**Action**
• Remove the sample tube from the inlet sample connector, if the fault clears the fault is in the sample path, otherwise the fault is internal to the cloud chamber. • If a scanning module is fitted, attempt to identify where the blockage is within the path, starting with all tubes connected then remove the four tubes from the scanning block. If the fault clears the blockage is with the one or more of the four tubes, otherwise the fault is with the scanning module.	Sample path tubes: • Inspect the tube for traps or kinks. • Inspect inside the tube for debris. Scanning module: • Replace scanning module. Cloud Chamber: • Inspect the sample filter. Clean or replace where necessary. • Otherwise, replace the Cloud Chamber.
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.12 Fault 12 - Purge Fault

Fault Text	Cloud Chamber Purge Fault
Description of fault	The detector has reported the cloud chamber air purge route is blocked.

Identify the problem	**Action**
• Remove the purge tube from the inlet purge connector, if the fault clears, the fault is in the purge path, otherwise the fault is internal to the cloud chamber. • If a scanning module is fitted, the sample and purge tubes are connected therefore if a blockage occurs it is typical for both ‘sample’ and ‘purge’ faults to be generated. If this is not the case, the fault is likely internal to the Cloud Chamber.	Purge path tube: • Inspect the tube for traps or kinks. • Inspect inside the tube for debris. Cloud Chamber: • Inspect the purge filter. Clean or replace where necessary. • Otherwise, replace the Cloud Chamber.
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.13 Fault 13 - Not Applicable

Fault 13 is not applicable to the Cirrus CCD model.

14.14 Fault 14 – Not Applicable

Fault 14 is not applicable to the Cirrus CCD model.

14.15 Fault 15 - Not Applicable

Fault 15 is not applicable to the Cirrus CCD model.

14.16 Fault 16 - Fan Fault

Fault Text	Fan Fault
Description of fault	The detector has reported the fan, or the fan hardware driver isn't operating correctly.

Identify the problem	**Action**
• Fan termination connection damaged creating a short circuit. • Fan wires damaged creating a short circuit. • Fan is damaged. • Fan hardware damaged.	• Inspect the termination header and socket, repair where possible. • Inspect the fan wires, repair where possible. • Remove the fan connection, carefully measure the fan voltage using a DVM across each pin, nominal Voltage is between 6 V dc (5%) and 12 V dc (100%) (dependent upon the fan speed set). If the accepted Voltage is present, suspect the fan is damaged and replace. • If no Voltage is present at the fan connection pins or measures >12.5 V dc, suspect the fan hardware driver is damaged and replace main controller circuit board (wefa481).
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.17 Fault 17 - Corrupt Settings

Fault Text	Corrupt Settings
Description of fault	The detector has reported an error with the embedded settings within the memory of the microcontroller.

Identify the problem	**Action**
The problem is internal to either the microcontroller or the memory files, where a corruption breach has flagged an error.	Contact Technical Support or your local distributor for assistance.

14.18 Fault 18 – Unit Data Corrupt

Fault Text	Unit Data Corrupt
Description of fault	The detector has reported an error with the manufacture details stored in memory at time of production.

Identify the problem	**Action**
The embedded manufacture data, batch number and date of manufacture are either missing or have become corrupt in memory.	Contact Technical Support or your local distributor for assistance.

14.19 Fault 19 - Low Supply Fault

Fault Text	Low Supply Fault
Description of fault	The detector has reported that the power to the detector is low. A low supply fault is generated when the Voltage is less than 21 V dc.

Identify the problem	**Action**
• Check cable connections are terminated and making contact. • Check and measure the incoming Voltage level to the detector and the Voltage output from the power source.	• If the Voltage to the detector is >21 V dc suspect the hardware is damaged, replace detector. • If the Voltage at the detector is <21 V dc and the output Voltage from the power source is >21 V dc, inspect the cable to the detector, measure the length of cable and consult the cable datasheet for Voltage drop calculations. • If the output Voltage from the power source <21 V dc consult the relevant datasheet instructions for the power source.
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.20 Fault 20 - Supply Fault

Fault Text	Supply Fault
Description of fault	The supply fault input monitors the fault contact from the auxiliary power supply/charger equipment. The generation of a supply fault occurs when the input has detected the Voltage has fallen to less than 5 V dc.

Identify the problem	**Action**
Check the connections to and from the power supply/charger.	Re-terminate any broken connections where necessary.
It is necessary to investigate at the connected power supply/charger equipment to determine the cause of the fault. Consult the relevant power supply/charger datasheets for more information. Note: If the auxiliary power supply monitoring is not required or not possible, the 'supply fault' can be by-passed by routing the supply input (24 V) to the 'FLT' contact.	
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.21 Fault 21 - Corrupt File

Fault Text	Corrupt File
Description of fault	The detector has reported an error with the 'user interface' file store in onboard memory.

Identify the problem	**Action**
User interface file data is missing or corrupt.	Update the 'user interface' file, consult Section 11.3.7.
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.22 Fault 22 - Cold Unit Fault

Fault Text	Cold Unit Fault
Description of fault	The detector has reported the internal temperature has been 3 °C (37.4 °F) or lower for over 4 hours. The fault is intended to alert the user that the detectors water reserve is at risk of freezing if the temperature continues to drop to 0 °C (32 °F).

Identify the problem	**Action**
Typically, reduction in temperature is either caused by environmental conditions or malfunctioning equipment (for example air conditioning units).	The detectors sensitivity is greatly jeopardised when the temperature falls to and below freezing point. Ensure correct fire protection provisions have been put into place until the temperature has been rectified.
The Cirrus CCD should not be installed in environments where the ambient temperature can fall below 0 °C (32 °F).	
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.23 Fault 23 - Processor Fault

Fault Text	Processor Fault
Description of fault	The detector has reported the processor has unexpectedly reset.

Identify the problem	**Action**
The problem is internal to the microcontroller.	The fault may clear on a full power cycle, although it is recommended to contact Technical Support or your local distributor for assistance immediately.

14.24 Fault 24 - ROM Checksum Fault

Fault Text	ROM Checksum Fault
Description of fault	The detector has reported the internal Read Only Memory (ROM) is corrupt.

Identify the problem	**Action**
The problem is internal to the on-board ROM.	The fault may clear on a full power cycle, although it is recommended to contact Technical Support or your local distributor for assistance immediately.

14.25 Fault 25 - Isolated Unit

Fault Text	Isolated Unit
Description of fault	The detector IO setting ‘Isolated Unit’ has been activated via the monitored input, isolating the detectors output relays. Consult the IO Section 9.19 for further details.

Identify the problem	**Action**
When activation is not valid or expected, it is necessary to look at the connected auxiliary equipment to determine the cause of the fault.	
• Check the connections to and from the monitoring input. • Check the operation of the auxiliary equipment.	• Re-terminate any broken connections where necessary. • Repair any damaged cable where necessary. • Consult the relevant product datasheet when testing the equipment.
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.26 Fault 26 - Airflow Ignored

Fault Text	Pipe 1 Airflow Ignored Pipe 2 Airflow Ignored Pipe 3 Airflow Ignored Pipe 4 Airflow Ignored
Description of fault	The ‘airflow Ignored’ option of the corresponding inlet pipe has been enabled/selected within the airflow menu. Consult Airflow Section 9.12 for further details.

Identify the problem	**Action**
When this activation is not valid or expected, contact Technical Support or your local distributor for assistance.	

14.27 Fault 27 – Not Applicable

Fault 27 is not applicable to the Cirrus CCD model.

14.28 Fault 28 - Battery Fault

Fault Text	Battery Fault
Description of fault	The detector IO setting ‘Battery Fault’ has been activated via the monitored input. This input does not alter any operation within the detector only serves as a monitored indication for the auxiliary equipment, typically a battery charger. Consult the IO Section 9.19 for further details.

Identify the problem	**Action**
When activation is not valid or expected, it is necessary to look at the connected auxiliary equipment to determine the cause of the fault.	
• Check the connections to and from the monitoring input. • Check the operation of the auxiliary equipment.	• Re-terminate any broken connections where necessary. • Repair any damaged cable where necessary. • Consult the relevant product datasheet when testing the equipment.
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.29 Fault 29 - Mains Fault

Fault Text	Mains Fault
Description of fault	The detector IO setting ‘Mains Fault’ has been activated via the monitored input. This input does not alter any operation within the detector only serves as a monitored indication for the auxiliary equipment, typically a power supply/charger. Consult the IO Section 9.19 for further details.

Identify the problem	**Action**
When activation is not valid or expected, it is necessary to look at the connected auxiliary equipment to determine the cause of the fault.	
• Check the connections to and from the monitoring input. • Check the operation of the auxiliary equipment.	• Re-terminate any broken connections where necessary. • Repair any damaged cable where necessary. • Consult the relevant product datasheet when testing the equipment.
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.30 Fault 30 - Pipe Scan Halted Fault

Fault Text	Pipe 1 Pipe Scan Halted Fault Pipe 2 Pipe Scan Halted Fault Pipe 3 Pipe Scan Halted Fault Pipe 4 Pipe Scan Halted Fault
Description of fault	The pipe scan halt function forces the detector to sample from the halted pipe. Scanning detector only. Consult Section 9.10 for further details.

Identify the problem	**Action**
When this activation is not valid or expected, contact Technical Support or your local distributor for assistance.	

14.31 Fault 31 - Heat Fault

Fault Text	Pipe 1 Heat Fault Pipe 2 Heat Fault Pipe 3 Heat Fault Pipe 4 Heat Fault
Description of fault	The detector has reported the reading from the temperature sensor within the corresponding AFS is out of monitoring range. The monitoring range is between -15°C> and <85°C.

Identify the problem	**Action**
The hardware associated with monitoring the temperature or the thermistor sensor itself may be damaged.	Replace the AFS.

14.32 Fault 32 - Device Type Fault

Fault Text	Device Type Fault
Description of fault	The AFS fitted is the incorrect type for the Cirrus CCD.

Identify the problem	**Action**
The AFS is either the incorrect model type, or the internal memory has become corrupt.	Replace the AFS for the correct AFS model type required.

14.33 Fault 33 - Output Test Active

Fault Text	Output Test Active
Description of fault	The five output contacts can be individual tested for correct change of state by selecting ‘Check To Test’ in the IO menu. Consult Section 9.16 for further information.

Identify the problem	**Action**
When activation is not valid or expected, contact Technical Support or your local distributor for assistance.	

14.34 Fault 34 – Not Applicable

Fault 34 is not applicable to the Cirrus CCD model.

14.35 Fault 35 - CO End of Life

Fault Text	Pipe 1 CO End of Life Pipe 2 CO End of Life Pipe 3 CO End of Life Pipe 4 CO End of Life
Description of fault	The detector has reported the service life of the CO cell (where fitted) has expired.

Identify the problem	**Action**
CO Cell sensor service life expired.	Replace the AFS.

14.36 Fault 36 - Network Fault

Fault Text	Network Fault
Description of fault	The detector has reported no data is being received from any node on the RS485 serial communications network.

Identify the problem	**Action**
• Check cable connections are terminated and making contact [RS485: A, B and 0V]. • Check the condition (open-circuit or short circuits) of the cable between nodes. • Check if a 120 ohm termination resistor is installed.	• Re-terminate any broken connections where necessary. • Repair any damaged cable where necessary. • Terminate across A and B at the first and last node on the network.
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.37 Fault 37 – Cloud Chamber Calibration Fault

Fault Text	Cloud Chamber Calibration Fault
Description of fault	The detector has reported the cloud chamber water level has either not been calibrated or the calibrated data is missing. It is possible this fault can also cause a 'No Water' and a 'Water Fill Fault' to be displayed incorrectly, or not be displayed when either fault is valid.

Identify the problem	**Action**
• Water level calibration data missing. • Upgraded software to V1.009 or greater.	• Replace the cloud chamber. • Follow the programming guideline instructions when updating firmware on a cloud chamber, contact Protec Technical Support or your local distributor for assistance.
If it is not possible to identify the problem, contact Technical Support or your local distributor for assistance.	

14.38 Fault 38 - Hardware Fault

Fault Text	Hardware Fault
Description of fault	The detector has reported the internal component data checks have diagnosed a fault potentially causing incorrect operations.

Identify the problem	**Action**
The problem is internal to the on-board hardware.	The fault may clear on a full power cycle, although it is recommended to contact Protec Technical Support or your local distributor for assistance immediately.

14.39 Fault 39 – Not applicable

Fault 40 is not applicable to the ProPoint PLUS model.

14.40 Fault 40 – Pipe Break Fault

Fault Text	Pipe Break Fault
Description of fault	A fault will be displayed in cases where an End of Pipe Monitor is installed on the pipe system, and a break in the pipe has occurred.

Identify the problem	**Action**
Increase in airflow reading, check: • Detached sampling pipe. • Blower damaged/malfunctioning. • Damaged pipe.	• Locate and repair. • Replace component.

14.41 Fault 41 – Service Required – Cloud Chamber LED

Fault Text	Service Required – Cloud Chamber LED
Description of fault	Chamber LED sensors approaching maintenance threshold.

Identify the problem	**Action**
Levels of debris collecting on the Cloud Chamber LED over the lifetime of the product are approaching the threshold for servicing.	Book a service of the product.

14.42 Fault 42 – Service Required – Pipe

Fault Text	Service Required – Pipe 1, 2, 3 or 4
Description of fault	SCD sensors approaching maintenance threshold.

Identify the problem	**Action**
Levels of debris collecting on the SCD sensors over the lifetime of the product are approaching the threshold for servicing.	Book a service of the product.

14.43 Fault 43 – Incompatible Software

Fault Text	Incompatible Software
Description of fault	Software version is incompatible between modules within the detector.

Identify the problem	**Action**
	Contact Technical Support for compatible versions of software. Install updated software versions.

15 Events

The Cirrus CCD stores operational events within the internal memory ‘event log’. The following events are logged.

Log in	A user or engineer access level code has been entered.
Initialising	The SCDs have begun initialisation.
Power Up	The detector has powered up, occurring on first power, unstable supply voltage or after an undesired reset.
Fire Level	The fire level has increased above the alarm level.
Time Set	The internal detector time has been set.
Faults Cleared	All system faults have been cleared, system returned to normal status.
Event Log Cleared	The event log has been manually cleared.
Historic Graph	The historic graph has been manually cleared.
Cleared	Multiply events have automatically cleared.
Supply Brownout	The supply voltage has reduced below 18 V dc for more than 2 seconds.
Device Reset	Device (AFS or cloud chamber) has been reset.
Fire Reset	A fire condition has been manually reset.
Water Emptied	The water empty function has been activated.
Airflow Zeroed	The airflow has been zeroed.
Airflow Enabled/Disabled	The airflow fault monitoring has been enabled or disabled.
Airflow Faults Cleared	The latched airflow fault has been manually reset.
Isolated	The activation of configured detector outputs has been disabled.
Mains Fault	The input set to detect a mains fault is active.
Battery Fault	The input set to detect a battery fault is active.
Low Supply	The supply voltage is below 21 Volts.

16 Maintenance

16.1 Periodic Checks

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

- Daily by the User.
- Every three months by Protec Fire Detection 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.

16.2 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 faults reported previously have been rectified.

16.3 Quarterly Checks

The following must be performed every **three months** or every **six months**, dependent on installation risk assessment and environmental conditions. The frequency of these checks must be determined by the site risk assessor or an equivalent representative. The following must be performed by Protec Fire Detection or an authorised representative:

- Check the event log to determine any abnormalities.
- Refill the water bottle with distilled water.
- Check that all tubing is properly connected, with no kinks.
- Check inlet integrity.
- Check dc supply voltage level.
- Check alarm and sensitivity levels are as per specification.
- Check vacuum level.
- Check the LED current.
- Check the sampling system airflow readings.
- Perform a smoke response test (field test).
- Check transport times at furthest sampling point on each pipe and compare with previous result.
- Check and replace, where necessary, cloud chamber filters or any external filters on the sampling pipe array.

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.

16.4 Annual Checks

The following must be performed **every twelve months** by Protec Fire Detection or an authorised representative:

- Carry out the quarterly checks as previously described.
- Inspect and clean, if necessary, the Flow Thermistors.
- Inspect and clean, if necessary, the Cloud Chamber filters and Optics.

16.5 Cloud Chamber Water Requirements

Distilled water only, replenished as required, dependent upon environment. Low ambient humidity (<50% R.H) or high ambient temperature (>30 °C) conditions will increase the water usage.

For water not supplied directly from Protec Fire Detection the purity of the water must comply with the following parameters:

1. <5 PMM of TDS (total dissolved solids (minerals).
2. pH value of natural: 7pH.
3. Clear of bacteria.

16.6 Field Test

Ensure the buildings fire alarm system responsible person has authorised the use of smoke emitting material within the building.

Ensure the buildings fire alarm system responsible person has informed any vulnerable personnel before commencing any field testing.

Ensure the buildings fire alarm system responsible person has removed any flammable material(s) or liquid(s) located in close proximity to the field testing.

Ensure all smoke material are fully extinguished, ideally by submerging into water.

As part of the commissioning process and on each service visit, the Cirrus CCD detector systems must be functionally tested by a method that confirms that smoke can enter the sampling hole and produce a fire alarm signal at the detector. Either a cotton wick or a purposely designed smoke stick, are suitable methods to test the systems response. The method used must be repeated on each field test to ensure consistency between tests.

Before testing, ensure the alarm level background value is operating at its nominal value and the detector status is ‘System Normal’.

Introduce smoke into each sampling hole in turn and verify a response at the detector after each separate test. Where access is restricted or site conditions prevent this, at minimum, the furthest sampling hole or dedicated test point must be verified.

Tests to be performed on each pipe inlet.

The alarm thresholds must remain consistent between tests.

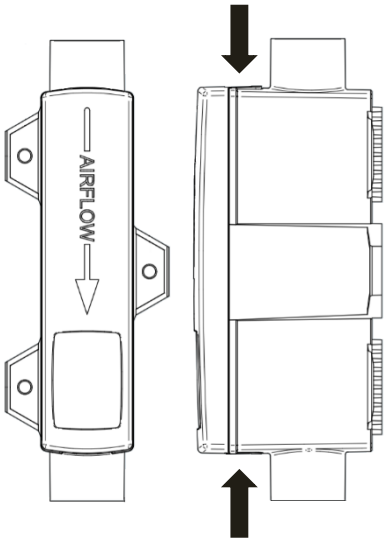
Record each transport time test.

After verifying the transport time from furthest hole or dedicated test point; compare results with previously recorded results to identify deviations. The transport time must be within the approval requirements. Requirements do differ dependent on design application 120secs for EN54 Part 20 [Class C & Class B] designs and 60secs for EN54 Part 20 [Class A] designs.

16.7 In-Line filter Maintenance

Some installations will use in-line filters to remove larger particles or to protect the detector from excessive dust accumulation.

16.7.1 Accessing the Filter



Unclip the lid at both ends to access the filter.

Visually check the filter for obstructions or blockages, clean or replace the filter as necessary.

After cleaning or replacing the filter mesh, it may be necessary for an engineer to zero the airflow Section 9.12.

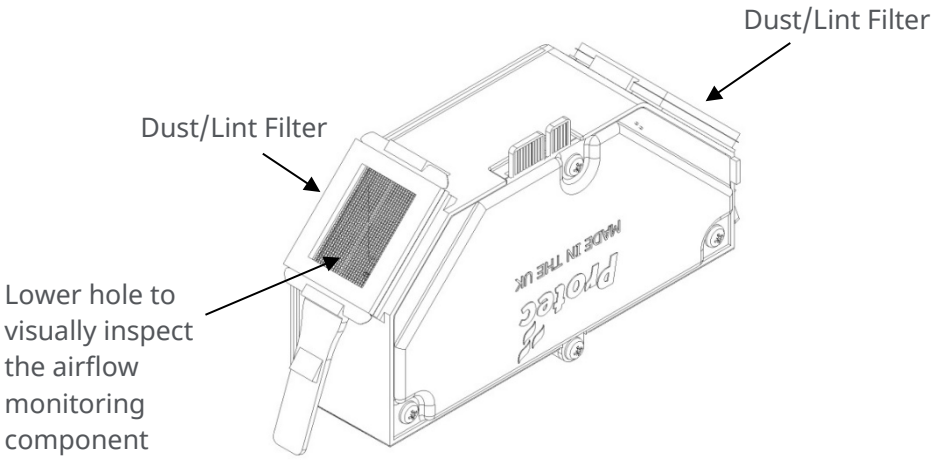
A large change in airflow could affect detector response time, an engineer will be required to perform a transport time test to check the response time remains within acceptable limits.

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.

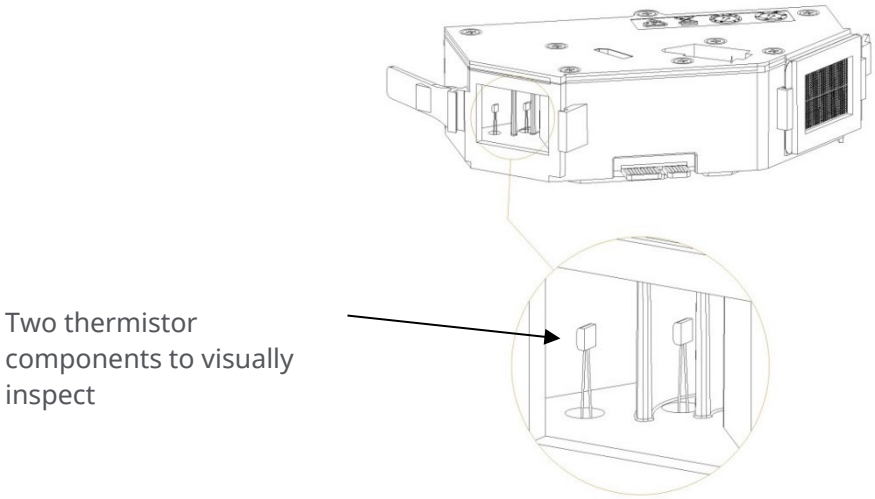
16.8 Cleaning the Airflow Filters and Airflow Thermistor

Authorised & trained personal only.

Due to the continuous airflow through the AFS module the filters can accumulate dust, dirt, and lint etc. As such, these should be cleaned on a regular basis to prevent airflow faults from developing. Depending on the environment this may need to be more frequent and should be evaluated at commissioning and each service visit.



To clean, disconnect the power supply to the detector, remove the front cover and unscrew the two captive screws holding the display cassette in position, swing open the display cassette. Remove an AFS and remove the two air filters from each side. Clean the filters by removing any loose dust with a soft brush. Inspect inside the lower hole of the AFS, viewing the two thermistor components, if absolutely necessary clean with soft brush, these components are fragile and must remain upright for correct operation.



Re-assemble the filters, replace the AFS in position. Secure the two captive screws and replace the front cover. Test to ensure the detector operates correctly.

Components must be positioned upright for correct and accurate operation.

16.9 Cleaning the AFS Internally

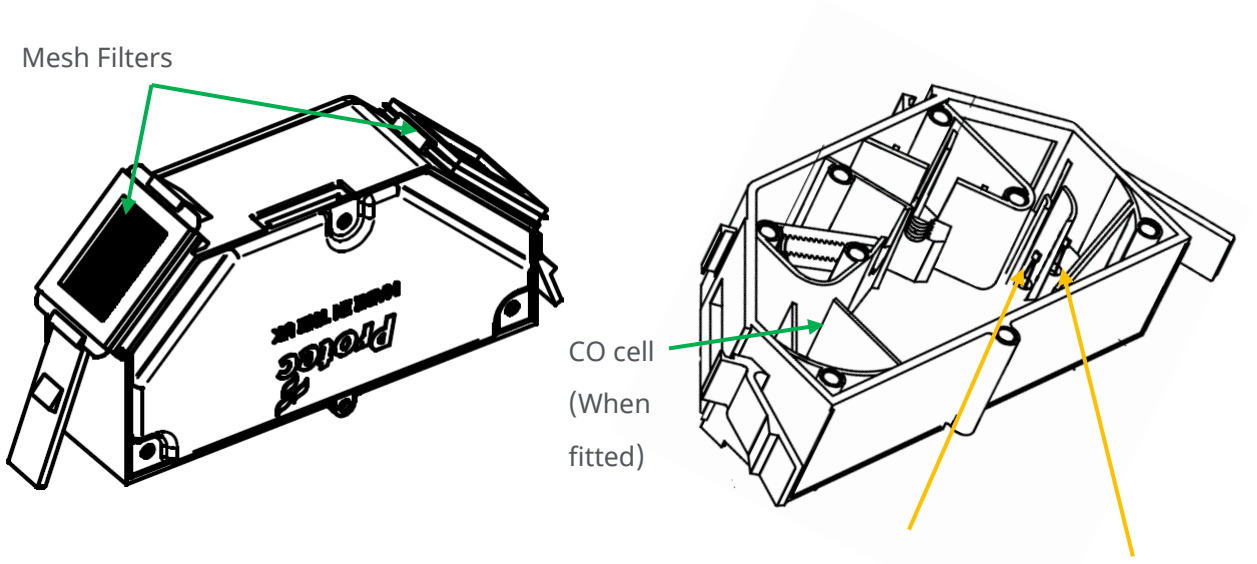
Authorised & trained personal only.

If the visual inspection while cleaning the airflow filters reveals that the AFS requires cleaning, the following procedure should be performed.

16.9.1 Pre-Servicing Requirements

1. Equipment required: Suitable Pozidriv® screwdriver.
   Soft antistatic clean brush.
   Spares pack: N 51-448-00 (Contains parts to clean 12 AFSs).
2. Work in a very clean, dust free environment.
3. Discharge static build up before working (e.g., touch an unpainted part of a metal radiator).

16.9.2 Details the Components of the AFS.



(a) Airflow sensor and
(b) Thermistor sensor monitoring inlet temperature

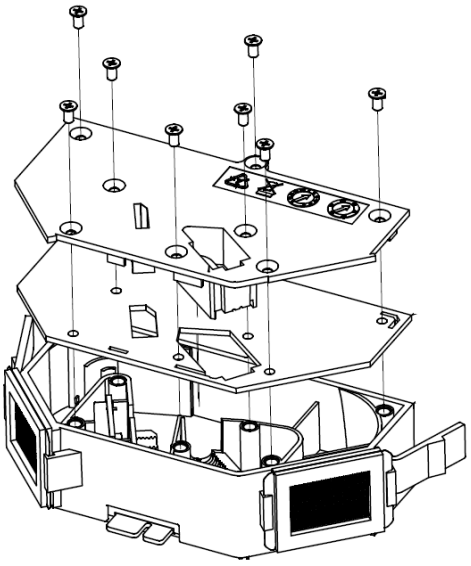
16.9.3 Procedure for Servicing the AFS

1. Preparing the AFS to be Serviced

   Note down the following information from the detector:

   - Airflow
   - Temperature

2. Disconnect the 24V power supply connection to the detector.
3. Remove the front cover and carefully unscrew the two captive screws holding the display cassette in position, swing open the display cassette.
4. Note down the serial number of the AFS to be serviced.
5. Carefully remove the AFS to be serviced.
6. Find a clean, dry, dust free area to work.
7. Carefully remove the two air mesh filters from each side of the AFS.
8. Clean the filters by removing any loose dust with a soft brush.

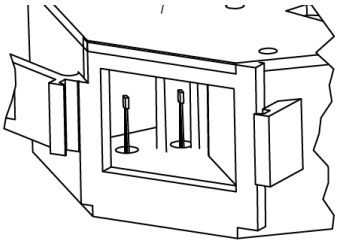


9. Peel back the calibration label.
10. Carefully remove the 8 screws.
11. Carefully remove the AFS lid and place in a clean dry area.
12. Remove the rubber gasket from the lid and discard.
13. Remove any loose debris.

    Inspect the internal areas of the AFS and, if loose debris is visible, carefully position the AFS upside down on a sheet of paper to remove the debris. Discard the debris.

14. Clean the Airflow and Thermistor sensor

    Inspect two thermistor components, if absolutely necessary clean with a soft brush, these components are extremely fragile and must remain upright for correct operation.



15. Re-assemble the AFS.

    Refit a new gasket on the AFS lid, ensure it has no tears or rips.

17. Carefully refit the AFS lid, ensuring the gasket is not trapped, and secure with the 8 screws.

    Do Not Overtighten.

18. Attach a service label over calibration label. Add serial number, engineer signature and date to the label.
19. Re-assemble the mesh filters on the AFS.
20. Refit the AFS into the detector, ensuring it is pushed fully home into the connector on the terminal board, check the AFS is fully clipped in and power up the detector.

16.9.4 Post Servicing Validation

Validate the AFSs have been re-assembled correctly and are functioning within its expected parameters.

Power the detector, wait for the initialisation to complete and the airflow to settle before performing the following checks.

Compare with the pre-servicing information noted.

Airflow	Ensure the airflow has returned to the accepted value.
Temperature	Ensure the temperature is approximately the same as previously noted, considering any ambient changes in temperature.

16.10 Component Service Life Expectancy

The service lifetime of the internal consumable components is very much dependent upon the sampled air quality and environmental conditions and may require earlier servicing that specified.

The components are deemed to be un-fit for use after the estimated life expectancy.

The published figures are reliant upon regular preventative maintenance programs for the product, as recommended by Protec and replacement of consumable parts (with replacement parts supplied by Protec) as and when required.

The service life of component parts is heavily dependent upon prevailing site conditions.
In particular, particulates, contamination and excessive humidity in the sampled air are key factors which adversely affect lifetime. Installations which are subject to environmental extremes, or excessive levels of contaminates are likely to require more frequent exchange of consumable parts and enhanced servicing regimes.

		Life Expectancy (at 24 V dc, 0 – 45°C)		
Application/ Environment	**Consumable/Serviceable Components**	**Inline filter Serviced**	**No inline filter**	**High Humidity (50%RH)**
Clean room	AFS [Airflow sensor]	10 years+	8 years	5 years
	AFS [CO cell]	8 years		
	Centrifugal Fan	9 years+	8 years	
	Vacuum Pump	9 years+		
	Cloud Chamber	7 years+		
Office	AFS [Airflow sensor]	10 years+	8 years	5 years
	AFS [CO cell]	8 years		
	Centrifugal Fan	9 years+	5 years	
	Vacuum Pump	9 years+		
	Cloud Chamber	7 years+	7 years	
Industrial	AFS [Airflow sensor]	10 years	5 years	3 years
	AFS [CO cell]	8 years		
	Centrifugal Fan	9 years	3 years	
	Vacuum Pump	9 years		
	Cloud Chamber	7 years	5 years	

In order to maximise the working life of the product, Protec strongly recommend the installation of a suitable inline air filter, per sampling pipe. Protec can supply suitable filters upon request. To ensure the product works to specification, any installed filters must be regularly inspected and maintained as necessary.

17 Technical Specifications

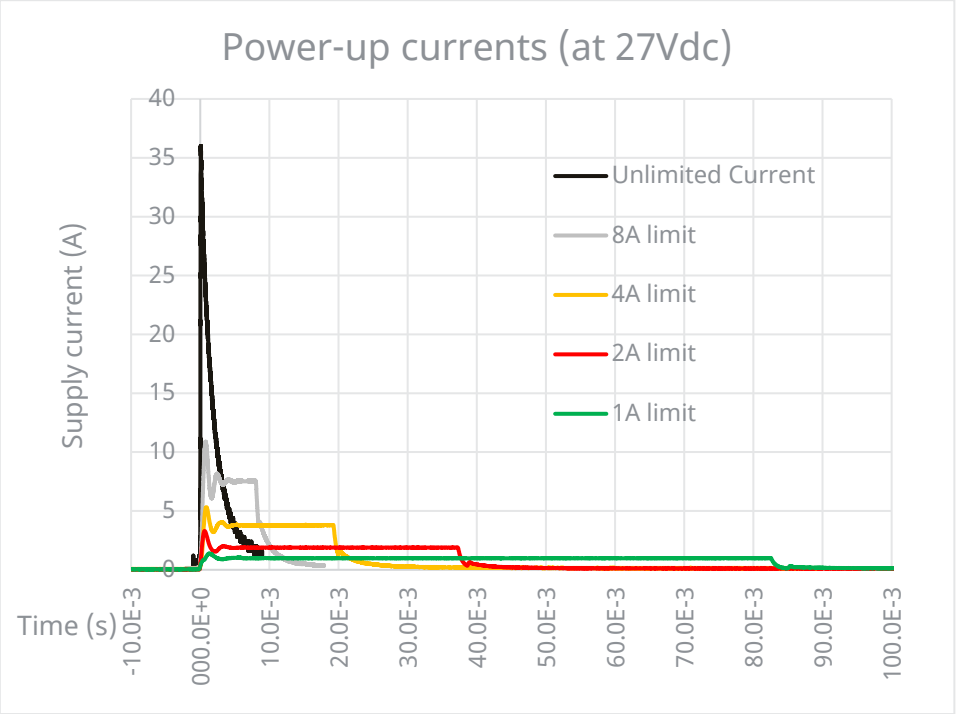
Parameter	Operating Conditions/Limitations
Power Supply	20 V dc to 28 V dc, Minimum 2 A dc. Approved to international code/standard
Power Supply Fuse	1.6 A
Voltage Operating Range	20 V dc to 28 V dc
Power Consumption Non-Scanning Detector	16.4 Watts quiescent [Non Scanner] (24 V dc 100% Fan Speed, 4 Pipe Detector)
Power Consumption Scanning Detector	20.1 Watts quiescent (24 V dc 100% Fan Speed, 4 Pipe Detector)
Current Consumption Non-Scanning Detector	685 mA dc quiescent (24 V dc 100% Fan Speed, 4 Pipe Detector) 785 mA dc alarm (24 V dc 100% Fan Speed, 4 Pipe Detector)
Current Consumption Scanning Detector	840 mA dc quiescent (24 V dc 100% Fan Speed, 4 Pipe Detector) 940 mA dc alarm (24 V dc 100% Fan Speed, 4 Pipe Detector)
Peak Current Inrush	Refer to Appendix Section 18.1
Peak Current Pump Cycle	Initial peak 7.8 A duration 1ms *[unlimited current source]* Second peak 1.44 A duration approx. 40ms
Power Cable Impedance	<2.5 Ω (cable from power supply to the detector)
Loop Protocol	6000/6000PLUS
Loop Isolator	On board isolator consult Protec DEL2110 for details (No maintenance required)
Fault Contact	Rated at 30 V dc 1 A dc maximum [Normally closed]
Inputs [1 to 3]	3 Programmable monitored inputs 30 V dc [Active Low]
	Max applied voltage 30 V dc, Open Circuit Voltage ~16 V dc
	Closed Circuit Resistance 1k5Ω
Output Contacts [1 to 5]	5 Programmable Clean Contacts Outputs
	Rated at 30 V dc, 1 A dc max [Normally open]
Power Supply Input Monitor	Nominal 24 V dc Input, Fault ≤ 5 V dc
Temperature Range	0°C to 45°C (32°F to 113°F) ambient
Humidity Limit	10 - 93% non-condensing ambient
Indicators	Power [Green LED]
	Fault [Amber LED]
	PreAlarm [Amber LED]
	Alarm/Fire [Red LED]
	7” LCD touch screen display

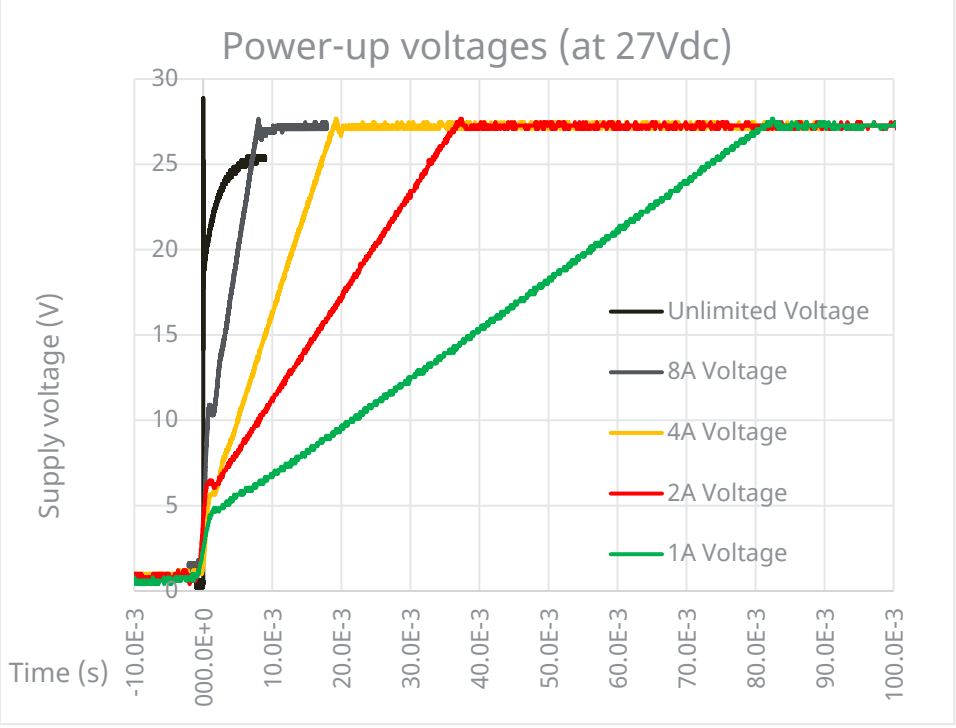
Water Requirements	Distilled (or Triple De-Ionised Water), replenished as required, dependent upon environment. Consult Section 16.5.
Sensitivity Range	0.002u/l³. 10,000 particles per cc to 10 million particles per cc
Carbon Monoxide	1 to 150 ppm
Sensitivity Settings	7-day programmable settings with daily time zones.
Sound Pressure Levels	72dB [peak] (Blower at 100%)
Airflow Monitoring	High and Low airflow monitoring
Airflow Monitoring Range	± 5% to 75% respectively. For EN54 Part 20 compliance, airflow fault tolerance set to ≤ 20%.
Airflow Velocity Range	0.5m/s to 6m/s
Event Log/Data Retention	24,000 events stored on first in, first out basis (alarms, actions, faults, and data points). Approx. 30-day historical graph data
IP Rating	IP30
Housing	Plastic (ABS)
Cable Access	10x 20mm replaceable knockouts
Cable Termination	Screw terminal blocks
	(0.2 - 2.5 mm^2, 30 - 12AWG)
Connectivity	TCP/IP Networking Protocol RJ45 Socket connection
	USB type B Socket connection
Pipe Fitment O.D.	25 mm (0.984 in) nominal, push to fit tapered inlet
Pipe Length Maximum	Recommend consulting the pipe calculation program
Engineer code (default)	314431
User code (default)	1442
Models	61-986-C1 Pipe 1 (non-scanner) 61-986-C2S Pipe 2 (scanner) 61-986-C3S Pipe 3 (scanner) 61-986-C4S Pipe 4 (scanner) 61-986-C1ND Pipe 1 No Display (non-scanner) 61-986-C2ND Pipe 2 No Display (scanner) 61-986-C3ND Pipe 3 No Display (scanner) 61-986-C4ND Pipe 4 No Display (scanner)
Peripheral Equipment & Accessories	Refer to Document RDM0065 All Pipes must comply with BS EN 61386-1

18 Appendix

18.1 Peak current Inrush

The inrush current upon power up is detailed in the below charts, the plots show the current & supply voltage when the current is limited, providing the peak inrush current and voltage power up delay.





18.2 Current Consumption Table

The current consumption is dependent upon the blower speed and the detector type (number of pipes/AFS's fitted). Please use the table below to calculate the total quiescent and alarm current.

		Cirrus CCD (1 pipe)			Cirrus CCD SCANNER						
		Quiescent (mA)		Alarm (mA)	Quiescent (mA)			Alarm (mA)			
No. of AFSs		1	1	1	2	3	4	1	2	3	4
Blower Speed (%)	100	522	622	677	745	781	840	777	845	881	940
	95	504	604	658	726	762	803	758	826	862	903
	90	485	585	638	711	748	793	738	811	848	893
	85	463	563	615	697	724	756	715	797	824	856
	80	449	549	600	682	705	741	700	782	805	841
	75	431	531	581	645	685	717	681	745	785	817
	70	417	517	566	630	671	698	666	730	771	798
	65	404	504	552	615	652	683	652	715	752	783
	60	390	490	537	601	632	664	637	701	732	764
	55	376	476	522	586	618	650	622	686	718	750
	50	372	472	517	562	599	630	617	662	699	730
	45	363	463	507	552	589	616	607	652	689	716
	40	349	449	504	550	586	613	604	650	686	713
	35	335	435	490	536	572	600	590	636	672	700
	30	322	422	477	522	577	590	577	622	677	690
	25	317	417	472	518	550	572	572	618	650	672
	20	308	408	463	509	527	550	563	609	627	650
	15	299	399	454	500	513	536	554	600	613	636
	10	295	395	450	490	500	522	550	590	600	622
	5	290	390	445	472	486	513	545	572	586	613

The following information is intended to be a guide to calculating the standby battery limitations and requirements.

18.3 Standby Battery Calculations

Total Quiescent		A	Total Alarm		A
	X			X	
Standby Hours	24		Alarm Hours		
	=			=	
Standby Capacity		A	Alarm Capacity		A

Total Capacity(A) Total Capacity(mA) = Standby + Alarm		A
Battery Safety Factor	x 1.25	
Battery Back Up Required Total Capacity(A) x Battery Safety Factor		Ah
Battery Back Up Charge Error 40% (Battery Back Up/100) x 40		Ah

Estimated charger size to be able to recharge the above batteries within the 24-hour time required by BS5839 _____ Amps

((Battery Back Up Charge Error (Ampere/hour) + Battery Back Up (Ampere/hour))/Standby Hours) + Alarm Capacity (Amps)

The total capacity calculation includes for a derating factor of 1.06 as detailed in FIA Guide for Power Supplies.

Be aware the peak current drawn upon each sample cycle is 1.1A (quiescent) for 2 seconds every 7 seconds. The maximum pump switch ON peak is 1.55A (~100ms).

19 Conformity

CE **0905**	UKCA **0359**
Protec Fire Detection PLC, Protec House, Churchill Way, Nelson, Lancashire, BB9 6RT, United Kingdom	
23	
PFD-CPR-0108	PFD-UKCA-0108
EN 54-17: 2005 Short Circuit Isolator EN 54-20: 2006 Aspirating Smoke Detectors for fire detection and fire alarm systems for buildings Class A, B and C Technical data included in this manual	

Figure 19 – Conformity Information

Cirrus CCD – Installation, Commissioning and Maintenance Manual
12/03/2024 RDM0009 Issue 1

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