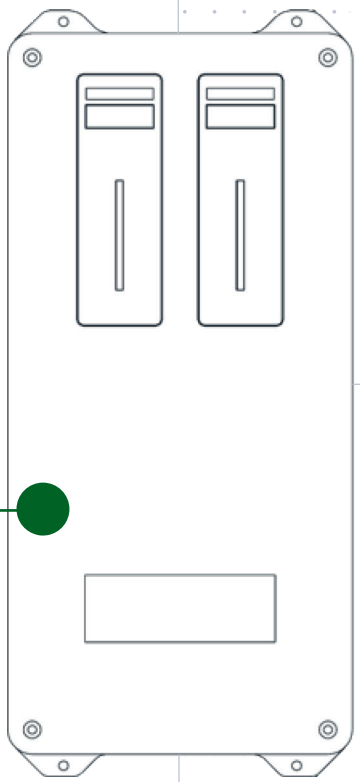


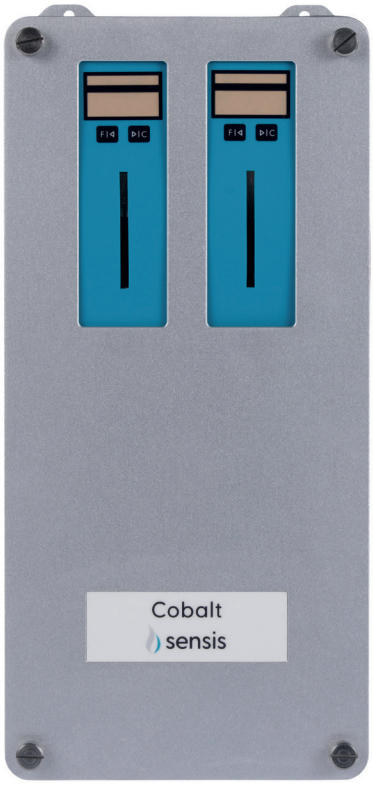
Sensis Cobalt HM Series User guide

Contents

1. General

The Cobalt HM Series by FFE is designed specifically for early smoke detection in small to medium-sized areas. The Cobalt Aspirating Smoke Detector works by drawing air samples through a network of pipes to detect fire conditions at the earliest stages.

Equipped with a HSSD (High Sensitive Smoke Detection) chamber, this versatile device is available in both single-channel and dual-channel models. Each channel features a pipe inlet, a front display, a HSSD chamber, an aspirator and flow sensor. They integrate a range of sensors such as smoke, temperature and humidity, offering advanced detection capabilities for various applications.



2. Features

The Cobalt smoke detector utilises a high-power, short-wavelength blue LED as its primary detection light source. This blue LED is highly sensitive to small smoke particles, even those not visible to the human eye, which often appear during the early stages of a fire.

Cobalt employs a specially designed smoke chamber to provide a precise indication of smoke concentration in the air from the detection zone. This method ensures effective detection of both small and large smoke particles.

The Cobalt features a 3-in-1 mini display providing real-time sample information on smoke levels, air flow, temperature, relative humidity and active events. The display also offers control functions and basic configuration settings for easy operation and monitoring.

A unique feature of Cobalt is its Smart Smoke Level (SSL) algorithm, which activates automatically when the device is powered on. This algorithm operates continuously, monitoring background particle levels around the clock. By calculating and using the average background particle level as a reference point for detection, Cobalt ensures consistent performance. The Cobalt series should always be installed with an inline filter, FFE Part number 4800-002. This extends the service life of the smoke detection chamber, preventing premature contamination.

FEATURES
Smoke detection range: 0.02~25%/m
Alarm sensitivity: 0.02 (Alert) and 20 %/m
Four alarm levels: Alert, Action, Fire1, Fire2
Built-in temperature and humidity sensors
1 channel version with 2 relay outputs (configurable) and 1 GPI (configurable)
2 channels version with 4 relay outputs (configurable) and 2 GPI (configurable)
Mini 3-in-1 display
RS485 network
Support Modbus RTU open protocol
Expansion input-output module (optional)

3. Specification

MODELS			
HM1	Single Channel ASD	**HM2**	Dual Channels ASD

SPECIFICATION	HM1	HM2
Smoke detection light source	High power blue LED	
Number of high sensitive smoke chamber	1	2
Smoke detection principle	Forward light scattering mass detection	
Smoke detection range	0.02~25%/m	
Alarm sensitivity	0.02 (Alert) and 20 %/m	
Sampling pipe	Material: ABS/CPVC, OD: 25 mm	
Pipe length (linear/branch)	105/260 m (344½ /1181 ft)	2 x 105 m, 2 x 260 m (2 x 344½ ft, 2 x 1181 ft)
Max. no. of sampling holes (Class A/B/C)	8 /16/30	16 / 32 /64
Alarm levels and time delay	Alert (0~60 sec.) Action (0~60 sec.) Fire-1 (0~60 sec.) Fire-2 (0~60 sec.)	
Numerical display	Yes (four digit) status bar	
LED Indicators	5-colour (Green/Yellow/Blue/Red/Purple) status bar	
Control function on display	Reset, Isolate, Mute, Test	
Alarm buzzer	Yes, with different Alarm Tone and Fault Tone background level learning	
Alarm strobe	Yes	
Alarm strobe flashing mode	Slow, Fast, Burst	
Environment smoke learning	24 hours, 365 days non-stop smoke background level learning	
Number of air flow sensors	1	2
Flow detection principle	Heat mass detection	
Flow monitoring	Pipe flow normalise to 100% Flow high and flow low fault Adjustable flow detection sensitivity Adjustable flow fault threshold	
Aspirator quantity	1	2
Aspirator speed	1~10	1~10
Relay output	2 relays (configurable) Rating: 2 A @ 30 Vdc	4 relays (configurable) Rating: 2 A @ 30 Vdc
General purpose inputs	1 x GPI (configurable) x 2"(d))	2 x GPI (configurable)
*Note: UDI, User Defined Input	GPI functions: RESET/ISOLATE/MUTE/TEST/MAINS FAULT/BATT. FAULT/POWER FAULT/SENSITIVITY MODE 1/SENSITIVITY MODE 2/SCAN/UDI-1/UDI-2/UDI-4/UDI-5.	
Communication	RS485 network. Max. number of devices on network: 250 Max. total cable length for all Cobalt devices: 1.2 km. Support Modbus RTU open protocol	
Event logs	Number of events: 183,000 Event type: Alarm/Fault/OperationSmoke/Flow/Auxiliary Sensors	
Voltage	18~30 Vdc	
Current @24 V	145 mA~185 mA	290 mA~370 mA
Dimension	321.7(h) x 154(l) x 97.4(w) mm (12½"(h) x 6"(l) x3¾"(w))	
Weight	2.2 kg (4¾ lb)	2.3 kg (5 lb)
IP rating	IP51	IP51
Operating conditions	Ambient temperature: 0~40°C (-32~104°F) Sampling air temperature: -20~60°C (-4~140°F). Humidity: 10~95% RH non-condensing.	

3. Specification

IMPORTANT NOTES:
Per EN 54-20, the sampling pipes and fittings shall have adequate mechanical strength and temperature resistance in accordance with EN61386-1 to at least Class 1131. The requirements of EN54-20 sub-clause 5.7 should be met.

The SensisFlow air sampling pipe network design tool can be used to calculate the maximum transport time and sampling hole sensitivity. The table (left) serves as a general overview with a symmetrical design that fulfills a 120-second transport time. For asymmetrical designs and higher transport time requirements, verification using SensisFlow is necessary.

*Maximum pipe length and maximum number of sampling holes cannot be achieved at the same time. When maximum pipe length is the major design consideration, the number of sampling holes must be reduced. On the other hand, when maximum number of sampling holes is the major design consideration, the pipe length must be reduced.

4. Sampling pipework design

Designing an aspirating system is straightforward and often results in good performance with simple installations. However, there are essential rules that must be followed for all aspirating smoke detection systems. This manual provides a basic overview. For detailed information, please refer to the complete Sensis Design Manual.

CONSIDERATIONS

Primary detection sampling systems

Primary detection sampling systems are usually arranged to monitor the flow of air movement by the use of pipework and air sampling points mounted directly in the airflow. This type of system is usually regarded as supplementary to other forms of detection due to its limited response capability once the air movement ceases.

In such a system when monitoring a single point of supply or extract, its system sensitivity may be directly related as equal to the sensitivity of the central detector due to the cumulative effect. In the case of a system monitoring more than one point of supply/extract then the system sensitivity will only be determined in discussions with the manufacturer or his representative.

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

Secondary detection sampling systems

Secondary detection sampling systems are arranged such that the air-sampling points are sited and spaced as if they are point type smoke detectors. They can be positioned to satisfy NFPA 72, NFPA 76, BS 5839-1, BS 6266 and local fire code requirements when the calculated relative sensitivity per air-sampling hole equates to a point detector. See **Relative sensitivity**.

Maximum permissible transport time

The time taken for a system to transport a sample from a protected area should not exceed 120 seconds (2 minutes). Transport times in excess of this must be the subject of a variation. Shorter maximum transport times may be desirable in certain applications and should be specified as part of the risk assessment. For example, Class A ASD systems are generally designed with transport times of less than 60 seconds.

Maximum transport time can be directly affected by the installed sample pipe design (see Figures 1–2). The four-branch design will provide the shortest transport time.

Balance

Balance is generally expressed as a percentage. If all the sample points have the same amount of air entering each sample hole then this is invariably described as a system with 100% balance.

Relative sensitivity or system sensitivity

The relative sensitivity of each air-sampling hole (assuming that all sampling points have been calculated for an equivalent sensitivity i.e., 100% balance) can be calculated as a simple function of the detector sensitivity and the number of sample points. For example, a 0.1% high sensitivity detection device connected to pipework containing 40 equivalent air sampling points can be regarded as a 4%/m system which can be considered as a Class C sensitivity system. Unless otherwise stated in an approval documentation a figure of better than 5%/m sensitivity per hole may be applied.

Figure 1. Two-branch system

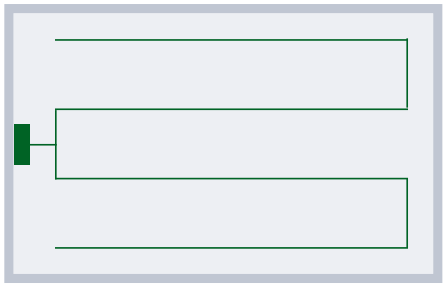
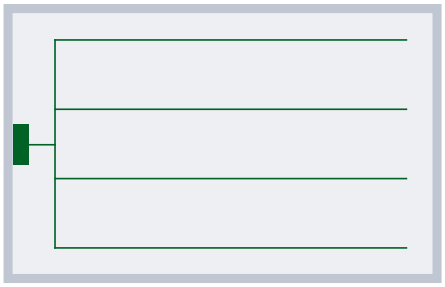


Figure 2. Four-branch system



ASD **Sampling pipe**

4. Sampling pipework design

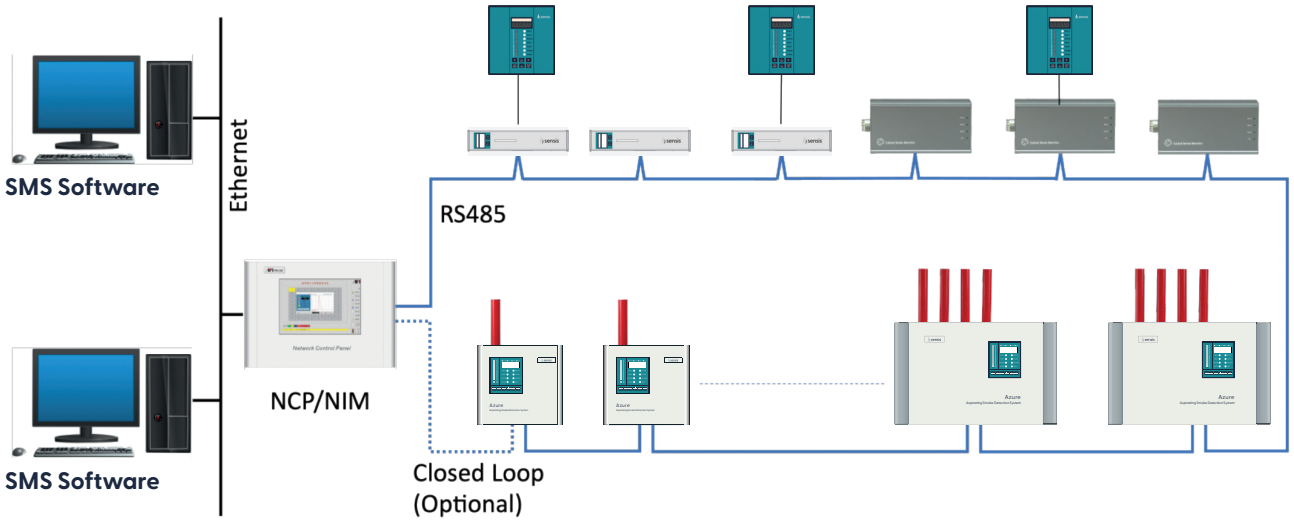
DESIGN GUIDELINES

- The ideal diameter of sampling pipes is OD: 25 mm / ID: 21 mm. Other sizes will often work but will provide different response times.
- Maximum pipework limitation. Please refer to Maximum Pipe Length on the Specification for the specific model's maximum condition in difference system performance (system sensitivity).
- Ideally, if the total length of sampling pipe is greater than 50 m (164 ft), then branch pipes should be used. When using branched sampling pipes, care should be taken to achieve a reasonable degree of balance (within 10% of airflow) to ensure even suction from the pipes.
- Sampling pipes must have capped ends. The end cap should be drilled with a sampling hole between 4 or 6 mm diameter or as calculated by SensisFlow and free from burrs.
- Sampling holes should normally be 2-4 mm diameter or as calculated by SensisFlow and free from burrs.
- This guide holds true for average sampling pipe lengths, but if using long pipes (typically more than 60 m (196¾ ft) total), performance may be improved by making the sampling holes near the ends slightly larger than those nearer the detector.
- Although by no means essential, it must be recommended that if in doubt, SensisFlow be used to ensure that transport times, balance of suction and individual sampling point sensitivity is within desired limits.

IMPORTANT NOTE:

Care should be taken for the size of detection zone, which typically is the area covered by one Aspirating Smoke Detector. Please check the local fire code or standard for the maximum area of a detection zone so that the design of an air-sampling pipe network complies with the regulation.

5. Networking



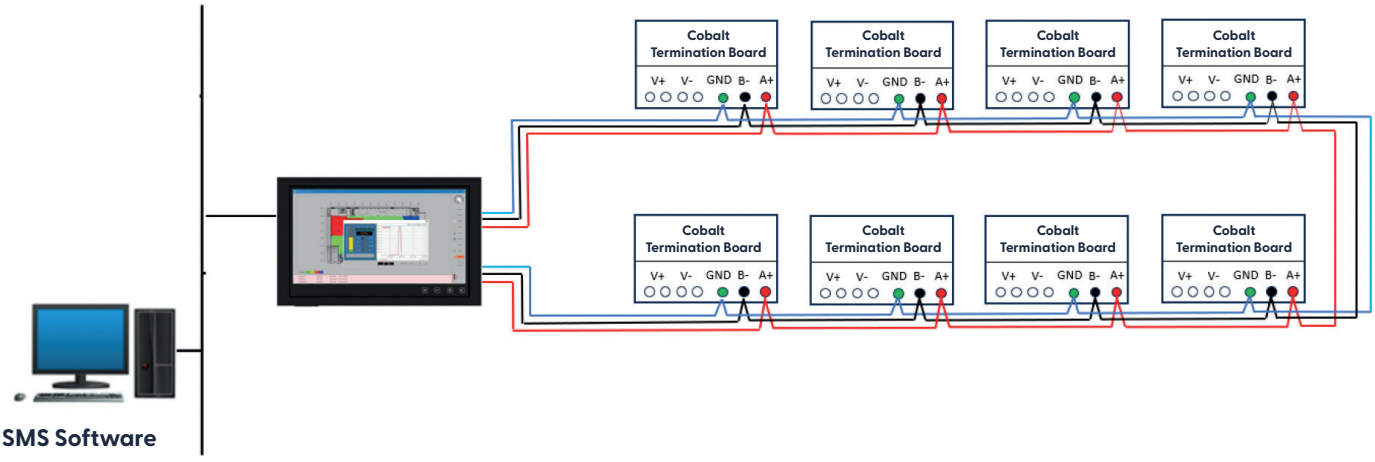
Sensis network structure

The Cobalt detector is equipped with RS485 connectivity, enabling integration with the SensisNet Control Panel (NCP), SensisNet Interface Module (NIM), or SensisNet Management Software (SMS) for centralised monitoring of Sensis devices on a network.

The RS485 communication network for Cobalt detectors supports a maximum cable length of 1.2 km. This range can be extended by an additional 1.2 km with the use of an RS485 repeater or a Sensis ASD that includes an integrated repeater circuit.

For commissioning, the Cobalt RS485 interface can connect to the SensisTool configuration and diagnostic software on a PC.

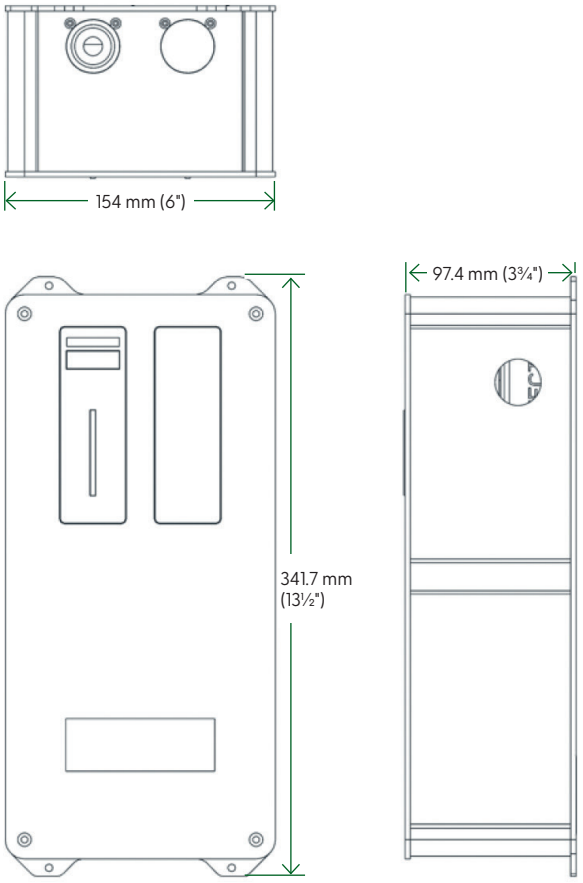
The Cobalt RS485 interface supports the Modbus RTU protocol with an open protocol architecture. The register definition table is available upon request, facilitating seamless integration with SCADA, PLC, or HMI systems without incurring additional costs.



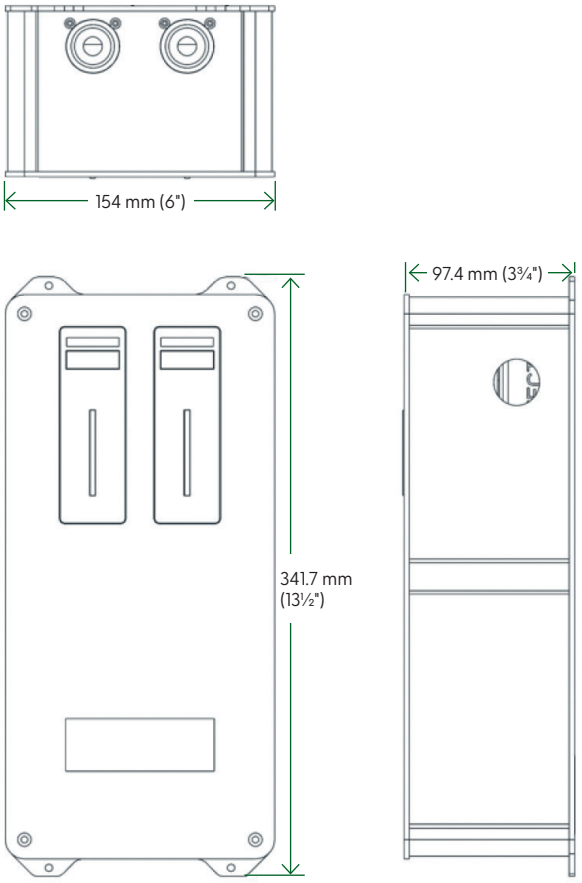
Sensis network structure

6. Mechanical installation

HM1 dimensions



HM2 dimensions



NOTE: It is recommended that the installation is carried out by suitably experienced and trained personnel.

Cobalt standard mounting dimensions

The mounting holes near each corner are used to mount the device on the wall. It is recommended the device is 1.5 m (5 ft) above the floor. The device location should be considered for easy access and suitable for the temperature and humidity operating condition mentioned in the specification.

Cable entries are also provided on the side and bottom. It should be noted that some cable entries are non-cut through holes – a punch using a screwdriver and hammer or a proper tool are needed to open the entry holes.

Sampling pipes

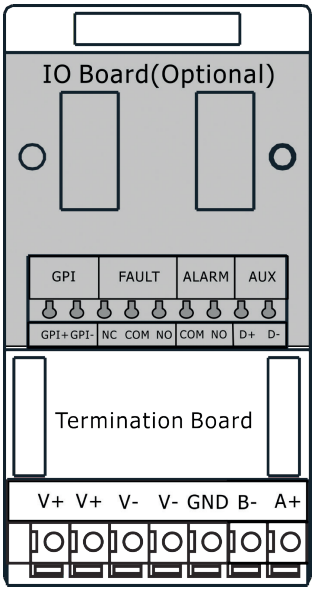
Sampling pipes should be made from a non-hazardous material and should be clearly identified. Typical sampling pipes used in air sampling systems are ABS/uPVC pipes with 25 mm (1") OD. The pipes should be marked with air sampling or aspirating smoke detection pipe to identify its usage. Red pipe is recommended for it is a fire alarm system.

In cases where high temperature or corrosion is a concern, metal or other suitable materials for that environment can be used. When drilling holes in the sample pipes, or cutting off lengths of pipe, ensure that all swarf and debris is removed from the pipe.

7. Electrical installation

NOTE: All the electrical connections should be made to the wiring terminals.

Wiring terminals



NOTE: GPI, Relays and AUX is located on the optional I/O Board

Cobalt wiring terminals definition

TERMINAL ASSIGNMENT	DESCRIPTION
Termination board	
V+/V-	Power input: 10~28.8 Vdc
GND, B-, A+	RS485 network communication
IO board (optional)	
GPI	Short the GPI input to activate the set function
Fault	Fault signal relay
Alarm	Fire 1 signal relay
AUX	Connect to auxiliary module such as RDU or other module (Firmware dependency)

CONDITIONS

1. Alarm conditions – smoke
When Cobalt ASD exceeds the Smoke Alarm threshold, Cobalt ASD will perform the following actions:
- Status bar will change from Green to Red
- Alarm relay will activate when it exceeds the Fire 1 threshold + delay time
- Alarm buzzer tone will be activated
- Alarm strobe will be activated and flashes
- Event will be logged with date and time stamp

2. Alarm conditions – temperature
When Cobalt ASD exceeds the temperature alarm threshold, Cobalt ASD will perform the following actions:
- Status bar will change from Green to Purple
- Optional relay (if equipped) will activate when it is configured
- Buzzer will be activated according to alarm tone
- Alarm strobe will be activated and flashes
- Event will be logged with date and time stamp

3. Alarm conditions – relative humidity
When Cobalt ASD exceeds the relative humidity alarm threshold, Cobalt ASD will perform the following actions:
- Status bar will change from Green to Purple
- Optional relay (if equipped) will activate when it is configured
- Buzzer will be activated according to alarm tone
- Alarm strobe will be activated and flashes
- Event will be logged with date and time stamp

4. Fault conditions
Cobalt ASD monitors for the following faults:
- Air flow fault
- Aspirator fault
- Filter fault (due, block)
- Communication fault (fan, HSSD, auxiliary sensor)
- Power fault
- Auxiliary sensor (temperature, RH) fault

When Cobalt ASD has faults as listed above, Cobalt ASD will perform the following actions:
- Status bar will change from Green to Yellow
- Fault relay
- Buzzer will be activated
- Event will be logged with date and time stamp

7. Electrical installation

CABLES

- Power cable should be 2.0 mm^2-2C of sufficient current carrying capacity.
- Control cable should be 0.75 mm^2 strands cable.
- RS485 network should be 24 AWG twisted pair shielded cable.

TERMINAL CONNECTIONS

Power supply connections

The Vdc power terminals on the termination board must be connected to a 12/24 (10~28) DC power supply. The device may be powered by any EN54-4 compliant monitored 24 DC power supply of sufficient capacity.

RS485

- One RS485 Terminals
- The maximum total cable length for all Cobalts on network is 1.2 km.
- RS485 network can be configured in closed loop for better communication reliability. The communication can switch direction to communicate with devices behind the failure point when there's device failure, line break or line short circuit.
- Sensis Management System computer software can monitor all devices on network.
- SCADA/HMI/PLC systems capable of Modbus RTU open protocol can communicate with Sensis devices.

Relay connections

There are two configurable relays on the termination board. The relay default outputs are as follows:

- Fault (NO/NC)
- Fire-1 (NO)

NOTE:
NO = Normally open
NC = Normally closed

The relay rating is 2 A @ 30 Vdc. If the connected load is more than the relay rating, a transfer relay suitable for the rating should be used.

All relays are configurable to one of the following functions: Alert, Action, Fire 1, Fire 2, Fault, Isolate and Auxiliary. The relay output function printed on the termination board is the factory default setting. Users can change the relay function using the SensisTool software or the Sensis Management computer software to change the setting. However, the fault relay, circuit is designed to normally closed to give a trouble signal when the device is powered off. Care should be taken for the relay's NO or NC connection when changing relay functions.

General Purpose Input (GPI

There is one General Purpose Input terminal on the Cobalt termination board. These inputs are designed to monitor the status of the connected devices. The connected devices monitored by the GPI can be just a button, a fault relay from the power supply, or even alarm relay from another detector. Short circuiting the input wires to any GPI will initiate its corresponding action as defined in the GPI settings. There are 12 possible functions in the following categories:

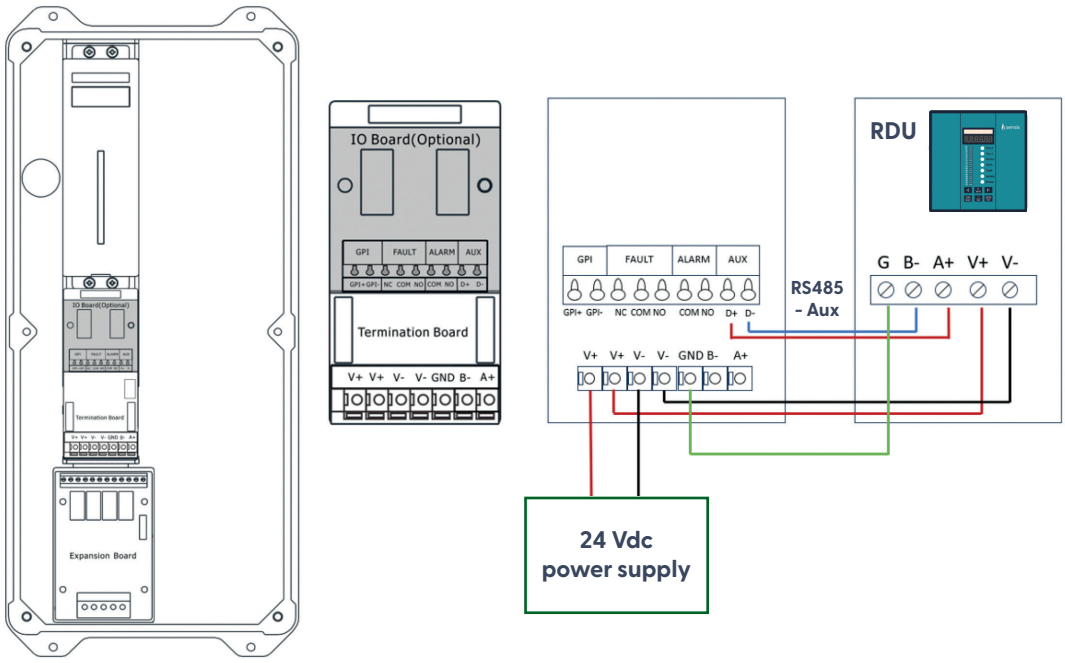
CATEGORIES & FUNCTION	DESCRIPTION
Device control Reset Isolate Mute Test	The GPI terminal can be connected to a remote button, a control/output module of the fire alarm system, or a PLC so those control function can be performed remotely, or by other systems.
Power monitoring Mains fault Battery fault Power fault	It is sometimes required by local code that the fault status of the mains and/or battery condition of the detector's power supply should be monitored. In this case, the Sensis detection device will signal a fault when the connected relay of power supply is activated. The Sensis fault condition can then be monitored by a fire alarm system when its fault relay is connected the fire alarm system input module.
Sensitivity change Sensitivity Mode 1 Sensitivity Mode 2	In some applications, the detection area environment background smoke level is different from day to night. For example, in a work hour the background smoke level is usually higher than during non-working hours. Sometimes, outside pollutants entering the detection area can generate a nuisance alarm. In this case, the GPI can be connected to a button, a timer, a PLC or even a relay output of another Sensis detector sensing the pollutant level from outside, so that that sensitivity adjustment can be made manually or locally.
User defined device monitoring UDI-1~5	The User Defined Input (UDI) is usually used to monitor the status (relay) of other detection devices, like gas sensors, temperature sensors, or other aspirating smoke detectors.

Auxiliary connections

The Power and RS485-AUX terminals on the Cobalt are the connection to Auxiliary Units. Current Auxiliary Units available are RDU (Remote Display Unit), Auxiliary Sensors and External Fan/Flow Unit. The Auxiliary Units can be powered from the CSD or separately provided by another power supply.

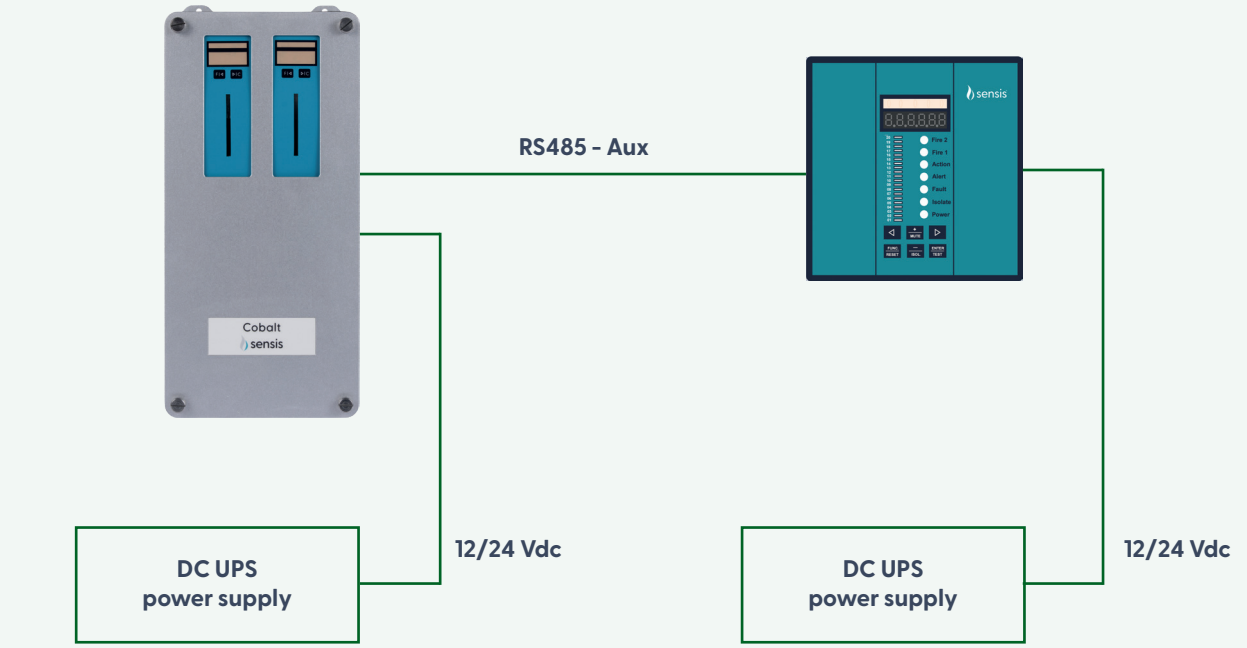
7. Electrical installation

Auxiliary connections
The Power and RS485-AUX terminals on the Cobalt are the connection to Auxiliary Units. Current Auxiliary Units available are RDU (Remote Display). Auxiliary Units can be powered from the ASD unit or separately provided by another power supply.



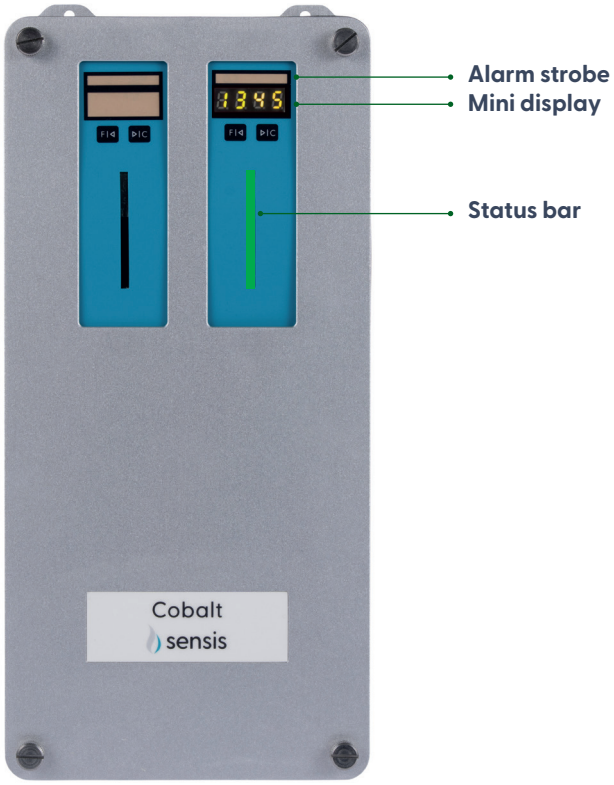
Cobalt and RDU Connection (RDU and Cobalt powered from single source)

7. Electrical installation



Cobalt and RDU Connection (RDU and Cobalt powered separately)

8. Operation



MINI DISPLAY

The Cobalt mini display and status bar provide the display of device operation conditions, control and basic function settings. The operation of the mini display is given in the following table. The term “Press” means Press the button once and “Long Press” means Press and hold the button for 2 seconds.

8. Operation

MODE	DISPLAY	DESCRIPTION
Display mode	**Press ▷|C F|◁ to switch between the following values**	
	Smoke	Default display. On initial power up the display shows a count down time (s) for the fast smoke learning to be completed.
	Flow Normalised (F)	Real-time normalised flow value in %. With the power on, it shows the count down time (s) for the flow normalisation process to be completed (if the Auto Normalisation is set to ON).
	Flow Raw	Real-time flow raw value
	Address (A)	Device RS485 Address
	Event (E)	When switched to Event, E__N indicates the number of events active. N=0 indicates no event. When N is other than 0, long press ▷|C to show the event code of the latest event. Press ▷|C or F|◁ to show the next or last event if multiple events. Long press ▷|C or F|◁ to return.
	Temperature (T)	Real time temperature in Cobalt
	Humidity (H)	Real time humidity
Prog. mode	**Long press F|◁ under display mode to enter the programmer mode to perform the following basic function settings.** **Press ▷|C or F|◁ to switch between functions. Long Press ▷|C to enter the function. The numerical display will be flashing to indicate the parameter that can now be changed. Press ▷|C or F|◁ to switch between parameters. Long press ▷|C to save the parameter.** **Long press F|◁ under programmer mode will return to display mode.** **No operation for more than 1 minute will automatically quit the programmer mode.** **NOTE: Full function settings should be conducted using RDU or SensisTool running on a PC. AMS or NCP also provide full function settings if the it's networked.**	
	Sensitivity (S)	S. 0.8/1.6/3.2/4.8/6.4/8.0/10.0/12.5
	Fan (F)	F. 0-10
	Address (N)	N.001-250 (the 2 pipe Cobalt HM2 has default address numbers 249 for pipe1 and 250 for pipe 2)
Control mode	**Long press ▷|C under display mode to enter control mode. Press ▷|C or F|◁ to switch between Reset/Iolate (DeIsolate)/Silence/Test operations. Long Press ▷|C to perform the selected operation and return to display mode.**	
	rESt	Reset
	ISoL/DeIS	Isolate/DeIsolate
	SILE	Silence
	tESt	Display test

8. Operation

STATUS BAR

The status bar on the Cobalt front panel indicates the following conditions.

STATUS BAR		INDICATION	DESCRIPTION
Colour	**Condition**		
Green	On	Normal operation	When the device is powered.
	Fast blinking	Smoke learn	When the device is in quick smoke learning.
	Slow blinking	Flow normalisation	When the device is in flow normalisation process.
Yellow	On	Fault	
Blue	On	Isolate	
Red	On	Alert Action Fire 1 Fire 2	When the device is in Alarm conditions. Red bar flashing indicates Alert/Action condition. **NOTE:** The Alarm levels can be identified from the flashing frequency of alarm strobe.
Purple	On	Aux sensor alarm	When the device auxiliary sensor (temperature and humidity) is in Alarm condition.

NOTE: The status bar shows only the highest-level condition when there're multiple conditions. The priority of the condition is Isolate > Alarm > Fault > OK. If Smoke Alarm and Aux. Alarm are both active, the status bar will show Red and Purple in rotation.

Alarm strobe

The flashing frequency options are listed below and can be changed in function settings. The alarm strobe works with the status bar to identify the alarm levels.

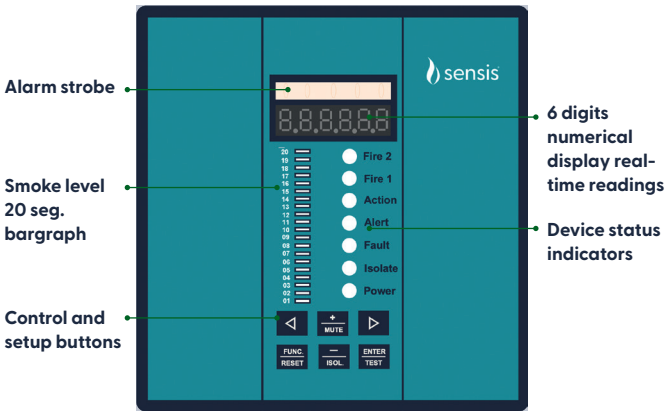
MODE	FLASH FREQUENCY	DEFAULT SETTING
0	Not used	
1	Slow flashing	Alert
2	Fast flashing	Action
3	Burst flashing	Fire 1 and Fire 2

NOTE: Alarm strobe will be stopped when the **MUTE** button is pressed. The flash will start again when a new event is activated. Alarm strobe flashing frequency can be changed. Refer to function settings for detail.

8. Operation

REMOTE DISPLAY UNIT (OPTIONAL)

The following instructions apply to Panel Mount, Rack Mount and Wall Mount Remote Display Units.



CONTROL

KEY	ACTION	DESCRIPTION
RESET	Press	Reset, press this key to clear alarms or faults.
ISOLATE/ DE-ISOLATE	Long press	The device will be isolated when it was not isolated. It will be de-isolated if it was isolated.
MUTE	Long press	The buzzer will be silenced and flashing will be stopped.
TEST	Long press	All LED indicators on the display will go on for 3 seconds and go off for 2 seconds as a cycle. The cycle repeats twice for the user to check if there is any malfunction LED.

The difference between MUTE and ISOLATE is that MUTE is for the buzzer/strobe in confirming the alarm or fault status. When there is a new alarm or fault in occurrence, the buzzer/strobe will activate again; ISOLATE is to isolate the system alarm from the corresponding output completely, so that there is no alarm output when the device is isolated.

Press and hold the RESET key for 2 seconds to enter into program mode. For the key function in program mode please see the parameter settings section.

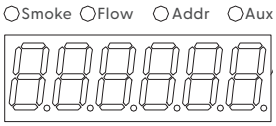
9. Display

INDICATORS

INDICATOR (COLOUR)		DESCRIPTION
Green	PWR	When the device is powered. Fast flash indicates the device is in Quick Smoke Learn Process. Slow flash indicates the device is in Flow Normalisation Process.
Blue	ISOL	When the device is isolated.
Yellow	FAULT	Smoke detection fault Airflow Hi/Lo fault, air flow sensor failed, aspirator failed System fault.
Red	ALERT	When the Alert threshold has been reached and the appropriate time delays have expired. The detector will generate Alert Alarm.
Red	ACTION	When the Action threshold has been reached and the appropriate time delays have expired. The detector will generate Action Alarm.
Red	FIRE 1	When the Fire 1 threshold has been reached and the appropriate time delays have expired. The detector will generate Fire 1 Alarm.
Red	FIRE 2	When the Fire 2 threshold has been reached and the appropriate time delays have expired. The detector will generate Fire 2 Alarm.
Yellow	Bargraph	Displays the real-time smoke level, with full scale of Fire 1 Level.
		In program mode, individual bargraph LED flashing indicates current parameter no.

NOTE: The status of the Alarm and Fault LEDs might not represent current device status. This is because the Alarm/Fault output will be maintained even when the Alarm/Fault condition no longer exists if the Alarm Latch or Fault Latch function is enabled. A manual reset will be needed to clear the Alarm or Fault.

6-DIGITS NUMERICAL LED



In normal operation, the 6-digit numerical LED displays real-time smoke level, airflow level, device address and current event in occurrence. Press ◁▷ buttons on the panel to switch the display item in sequence as follows:

Smoke (S) ⇄ Flow Normalised (Fn) ⇄ Flow Raw (Fr) ⇄ Address (Ad) ⇄ Event (E) ⇄ Temperature (T) ⇄ Humidity (H) ⇄ CO (g)

When switching to Event, the total number of active events will be displayed first. Press <+> <-> key to show the detail event message, including date, time and event code. For example, if there are two events, code A0 and E11, it displays 2 when switching to Event; press <+> will display A0 event message, press <+> again will display E11 event message, and then press <+> to return to the beginning 2. Where 2 represents the total number of events, A0 is the most updated event, and E11 is the previous event. If <-> is pressed, it will show the event backwards. If no active event exists, it displays NONE.

The numerical LED default display is smoke level. If it is switched from the default to another item and without any action in 10 minutes, it will switch back to the default item.

The default display item can be changed by pressing and holding the ◁ key for 2 seconds.

DISPLAY ITEM	NUMERICAL LED	UNIT	REMARKS
Smoke (S)	0.000~25.00	%/m	
Airflow (Fn)	0~200	%	
Flow Raw (Fr)	0~4095		
Address (Addr)	0~250		In setting other parameters, all indicators will go off (except smoke learning or air flow labeled flashing condition)
Event (E)	NONE A1~A14 E0~E35		
Temperature (T)	-40~125	°C	If enabled*
Humidity (H)	0~100	%RH	If enabled*

NOTE: The temperature and humidity display can be disabled – refer to function setting for detail.
The flashing indicators of moke Learning and/or Air Flow Normalising will continue to flash when switching the numerical display.

9. Display

BUZZER

The following buzzer modes indicate when the device is in Alarm or Fault status. Users can change the buzzer modes according to their application.

MODE	BUZZER ACTION
0	Disable the buzzer.
1	In Alarm, it beeps 1 second in every 10 seconds. In Fault, no beep.
2	In Alarm or Fault, it beeps 1 second in every 10 seconds.
3	In Alarm, it beeps continuously. In Fault, it beeps 1 second in every 10 seconds.
4	In Alarm or Fault, it beeps continuously.

ALARM FLASH

The flashing frequency options are listed below and can be changed in function settings.

MODE	FLASH FREQUENCY	DEFAULT SETTING
0	Not used	
1	Slow flashing	Alert
2	Fast flashing	Action
3	Burst flashing	Fire 1 and Fire 2

NOTE: Alarm flash will stop when the **MUTE** button is pressed. The flash will start again when a new event is activated. The alarm flashing frequency can be changed – refer to function settings for detail.

9. Display

EVENT MEMORY

Cobalt ASD has built in 183,000 events which will automatically log 13,000 events with date and time and 170,000 analogue data log for smoke, air flow, temperature, relative humidity and CO (if equipped)

The event memory can be read out from Cobalt via SensisTool. The event log that will be logged by Cobalt are as according to the table below.

TYPES	CODE	DESCRIPTION
Smoke Alarm	A1	Alert
	A2	Action
	A3	Fire 1
	A4	Fire 2
Auxiliary Sensor Alarm	A5	Sensor 1 (Temperature) High Alarm
	A6	Sensor 1 (Temperature) Rate of Rise Alarm
	A7	Sensor 2 (Humidity) High Alarm
	A8	Sensor 2 (Humidity) Rate of Rise Alarm
	A9	Sensor 3 High Alarm
	A10	Sensor 3 Rate of Rise Alarm
	A11	Sensor 4 (CO) High Alarm
	A12	Sensor 4 (CO) Rate of Rise Alarm
	A13	Sensor 5 High Alarm
	A14	Sensor 5 Rate of Rise Alarm
Smoke Detection Fault	E1	Smoke Detector Failed
	E2	Smoke Detector Service Required
	E3	Smoke Level High
	E4	Smoke Level Low
Flow Fault	E5	Aspirator Failed
	E6	Flow Sensor Failed
	E7	Pipe Flow High Fault
	E8	Pipe Flow Low Fault
	E9	Normalisation Failed
	E17	Filter Blockage
	E18	Filter Removed
	E19	Filter Due

TYPES	CODE	DESCRIPTION
Comms. Fault	E10	Programmer Not Found
	E11	Fan Board Not Found
	E12	Zone Relay Board Not Found
	E13	HSSD Not Found
	E14	Auxiliary Sensor Board Not Found
System Fault	E20	Power Fault
	E21	Battery Fault
	E22	Mains Fault
	E23	RTC Fault
	E24	Sensitivity Mode Confliction
Auxiliary Sensor Fault	E25	Sensor 1 Failed
	E26	Sensor 2 Failed
	E27	Sensor 3 Failed
	E28	Sensor 4 Failed
	E29	Sensor 5 Failed
Learning	E31	Flow Normalisation
	E32	Smoke Background Learning
Isolation	E30	Device Isolated
	E33	Zone Isolated
GPI	E34	GPI (Termination Board) Activated
	E35	GPI (RDU) Activated
	E40	GPI-UDI1 Active
	E41	GPI-UDI2 Active
	E42	GPI-UDI3 Active
	E43	GPI-UDI4 Active

The display panel has integrated control/programming that, when in operating mode, can execute the REST/ISOLATE/MUTE/TEST functions as well as to display the figure of Smoke/Flow/Addr/Evt by numerical LEDs. While in setting mode, the setting of related operating parameters of detecting devices can be done via keypad/Bargraph/numerical LEDs.

9. Display

KEY PAD	KEY ACTION	DESCRIPTION
FUNC.	Long press	In operating mode, enter into program mode.
RESET	Press	Reset.
◁	Press	Numerical LED display item switch leftward.
	Long press	Numerical LED display default item. The default item will be switched rightward to the next item.
▷	Press once	Numerical LED display item switch rightward.
+		
ISOL	Long press	Isolated
-		
MUTE	Long press	Mute
↵		
TEST	Long press	Display LED test

Table: Summary of key functions under operating mode

10. Programmer

- Press and hold **FUNC.** key for 2 seconds. under operating mode and enter into parameter setting mode, the Bargraph 01 indicator flashes and shows in setting 01 parameter with numerical LED displaying the parameter value of 01. If parameter password function was set to 1 (ON), password would be required before editing parameters, or the unit will only display information without editing. If password was set to 0 (OFF), direct editing parameters is possible after entering.

- Editing parameters: press +/- key to alter parameter value; adjust it to the proper figure and press and hold return key for 2 seconds to store; the numerical LEDs display will flash three times if successfully stored.

  NOTE: if password setting is 1 (ON) entering password or wrong password, pressing +/- will have no action.

- Bargraph grid represents parameter no., ex. Enter parameter 15 will lead 15th Bargraph grid starts to flash. Enter parameter 21 will lead 20th and 01 Bargraph grid in flashing, the rest may be deduced by analogy...

- If setting value exceeds the range permitted (i.e. fan rpm exceeds max., A1 valve value higher than A2, etc.), detector will judge automatically and jump to the max. value in next range.

- Press and hold **FUNC.** key for 2 seconds to exit the setting mode.

- If no action taken for 1 min. under setting mode, it will count down by 10 seconds in exiting the program mode.

KEY PAD	PRESSING KEY	EXECUTION
FUNC.	Long press	In program mode, exit program mode.
RESET		
◁	Press	Return to the previous parameter.
▷	Press	Move to next parameter.
-	Press	Reduce displayed value. When the value reaches the minimum, press <-> key will jump to the maximum value.
	Long press	Fast reducing displayed value.
ISOL		
+	Press	Increase the displayed value. When the value reaches the maximum, press <+> key will jump to the minimum value.
	Long press	Fast increasing displayed value.
MUTE		
ENTER	Long press	Save setting, the numerical LED will flashes three times if successfully saved.
TEST		

Table: Key function under program mode

11. Parameter functions

ITEM	MENU	PARAMETER	LEAD NO.	MIN	MAX	DFT	DESCRIPTION	ACCESS LEVEL
1	Alarm Level	Full Scale Sensitivity	AF.	0.1	12.5	0.2	The detector smoke level in %/m for the bargraph reaching its Full Scale/Fire 1 level (20 bars). The smaller the value, the higher the sensitivity is or vice versa. The resolution of Full Scale/Fire 1 setting is 0.1%/m.	ADM
		Alert Bargraph Level	A1.	4	4	4	The Alert "bargraph" level. When the alert bargraph level has been reached and the appropriate time delays have expired. The detector will generate Alert Alarm. The Alert Smoke Level (%/m) = Full Scale Level/20 x Alert Bargraph Level. For examples, by the default settings, the alert level is 0.2/20x10=0.1%/m.	
		Action Bargraph Level	A2.	12	12	12	The Action "bargraph" level. When the action bargraph level has been reached and the appropriate time delays have expired. The detector will generate Action Alarm. The Action Smoke Level (%/m) = Full Scale Level/20 x Action Bargraph Level. For examples, by the default settings, the action level is 0.2/20x15=0.15%/m.	
		Fire 1 Bargraph Level	A3.	20	20	20	The Fire 1 "bargraph" level. When the fire 1 bargraph level has been reached and the appropriate time delays have expired. The detector will generate Fire 1 Alarm. This setting is fixed to 20 and cannot be modified.	
		Fire 2 Level	A4.	0.1	20.0	3.2	The Fire 2 "smoke" level in %/m. When the smoke level has been reached and the appropriate time delays have expired. The detector will generate Fire 2 Alarm. The resolution of Fire 2 setting is 0.1%/m.	
2	Time Delay	Alert Delay	t1.	0	60	30	The Alarm Delay is the number of seconds that an alarm level has to be continuously sensed before the alarm is initiated. Each alarm level has a programmable delay of between 0 and 60 seconds.	ADM
		Action Delay	t2.	0	60	20		
		Fire 1 Delay	t3.	0	60	10		
		Fire 2 Delay	t4.	0	60	10		
3	Pipe Flow	Pipe Used	U.	OFF	ON	ON	Enable if the pipe is connected. It is used to enable or disable flow sensing on the specified pipe inlet of the detector. If any pipe inlets are unused, set the relevant flow sensor function for the pipe inlet to No to avoid unwanted flow faults.	ADM
		Pipe Flow High	H.	101	200	120	Flow high is the level above which airflow needs to increase to trigger a fault indication (which may indicate a loose or damaged inlet pipe).	
		Pipe Flow Low	L.	0	99	80	Flow low is the level below which airflow needs to be reduced to trigger a fault reading (which may indicate a blocked pipe).	
		Pipe Fan Speed	F.	0	10	5	The value entered sets the aspirator in the detector to one of a range of predetermined speeds. The lower the number entered the lower the airflow rate and the lower the power consumption.	
		Flow Sensitivity	S.	0	5	3	The flow detection sensitivity increase with the set number.	DST

11. Parameter functions

ITEM	MENU	PARAMETER	LEAD NO.	MIN	MAX	DFT	DESCRIPTION	ACCESS LEVEL
4	Normalise Flow	Normalise	NF.	OFF	ON	OFF	Setting this function to ON puts the detector into automatic flow normalisation process. This takes a few minutes to normalise the flow to 100% based on the current flow rates. During normalisation, the Power indicator (LED) on the CSD-H and RDU (if fitted) will flash to indicate the normalisation status. After normalisation, the flow reading greater than 100 means the current flow is bigger than normal condition, indicating a sign of pipe breakage. On the other hand, the flow reading less than 100 means the current flow is smaller than normal condition, indicating a sign of pipe or sampling port blockage. **NOTE**: It is crucial to make sure no breakage or blockage on the pipe before setting the device into normalisation process. Otherwise the system will see the abnormal condition as a normal condition.	DST
		AutoNorm.	NA.	OFF	ON	ON	Setting this function to ON will automatically go into normalisation process when the device is powered on.	
5	Alarm Action	Cascade Alarm	AC.	OFF	ON	ON	Setting this function to ON means that only when the detector's controller has gone into Alert does the controller start counting down the Action delay, i.e. the time delays on Alert and Action are cumulative. So are the following Fire 1 and Fire 2 delays. There are chances that the higher level alarm goes off before the lower level alarm if the setting of higher level alarm time delay is less than the time delay of lower level alarm and the smoke level increase quickly. Enable cascade alarm will guarantee the alarms go off step by step.	ADM
		Alarm Latch	AL.	OFF	ON	ON	When this function is set to ON it requires a reset on the front panel or a remote reset to clear an alarm condition. This means the alarms must be confirmed and reset manually even if the smoke level is decreased below alarm level. This is the factory default setting. When this function is set to OFF, the alarm will be reset automatically when the smoke level is decreased below alarm threshold.	
		Fault Latch	FL.	OFF	ON	OFF	When this function is set to ON it requires a reset from the front panel or a remote reset to clear fault indications. If this function is set to OFF, the fault will be reset automatically when the fault condition is cleared.	
		Fault Delay	Ft.	0	60	60	The fault delay is the number of seconds that a fault condition has to be continuously sensed before the fault is initiated.	
6	Filter (when enabled)	Filter Status	Fs.	0	100		Read only.	
		Filter Due	Fd.	0	730		Read only.	
		New Filter	FN.	OFF	ON	OFF	Set this function to ON to start a new filter life cycle when a new filter has been installed.	DST

11. Parameter functions

ITEM	MENU	PARAMETER	LEAD NO.	MIN	MAX	DFT	DESCRIPTION	ACCESS LEVEL
7	Front Panel	Reset Button	dr.	OFF	ON	ON	The front panel buttons may be enabled or disabled individually by setting these functions to ON or OFF.	ADM
		Isolate Button	dI.	OFF	ON	OFF		
		Mute Button	dS.	OFF	ON	ON		
		Test Button	dt.	OFF	ON	ON		
		Buzzer	db..	0	4	3	The front panel buzzer has different modes when it is set to the following numbers: **0:** Disable the buzzer, no sound in case of alarm or fault. **1:** In alarm, the buzzer sounds one second in every 10 seconds. In fault, the buzzer will not sound. **2:** In alarm and fault, the buzzer sounds one second in every 10 seconds. **3:** In alarm, the buzzer sounds consistently. In fault, the buzzer sounds one second in every 10 seconds. **4:** In alarm and fault, the buzzer sounds consistently.	
		Alert Flash	A1	0	3	1	0: Not Used 1: Slow Flashing 2: Fast Flashing 3: Burst Flashing	DST
		Action Flash	A2	0	3	2		
		Fire 1 Flash	A3	0	3	3		
		Fire 2 Flash	A4	0	3	3		
		GPI-1	I1.	0	115	0	Remote Display Unit (RDU, if fitted) Optional IO Board Settings. Please Refers to Item 9 (GPI) and 10 (Device Relay Configuration) for the Settings Value Definition.	
		Relay 1	r1.	1	109	2		
		Relay 2	r2.	1	109	3		
		Relay 3	r3.	1	109	5		
8	Control	RESET	Cr.	OFF	ON	OFF	This has the same effect as pressing the **RESET/ ISOLATE/SILENCE/TEST** buttons on the front panel.	ADM
		ISOLATE	CI..	OFF	ON	OFF		
		MUTE	CS.	OFF	ON	OFF		
		TEST	CT.	OFF	ON	OFF		
		Relay 1	r1.	OFF	ON	OFF	Relay test of the Display Expansion IO on RDU, when fitted.	DST
		Relay 2	r2.	OFF	ON	OFF		
		Relay 3	r3.	OFF	ON	OFF		
9	GPI	GPI-1	I1.	0	115	1	Setting the GPI terminal to below functions: 0: NOT USED 1: RESET 2: ISOLATE 3: MUTE 4: TEST 5: MAINS FAULT 6: BATT. FAULT 7: POWER FAULT 8: SENSITIVITY MODE 1 9: SENSITIVITY MODE 2 10: SCAN (QUARTAS-2000 Only) 11: UDI-1 12: UDI-2 13: UDI-3 14: UDI-4 15: UDI-5 Setting 101~115 will have the same functions as above but the GPI normal status will change from NO to NC. When the GPI is set to UDI, the UDI Relay ID 201~215 can be configured to provide the Relay output in case of UDI activation.	DST

11. Parameter functions

ITEM	MENU	PARAMETER	LEAD NO.	MIN	MAX	DFT	DESCRIPTION	ACCESS LEVEL
10	Device Relay Configuration	Relay 1	r1..	NA	NA	NA	This sets the termination board relays to below output: 1: ISOLATE 5: FIRE 1 2: FAUILT 6: FIRE 2 3: ALERT 7: AUXILIARY 4: ACTION 7~9: Aux. Sensor Output ID **NOTE:** Relay 2 is Normally Closed the others are Normally Open. Setting 101~109 will have same function as above but the Relay energisation will be reversed. i.e., NO become NC, NC become NO **NOTE:** Special ID 201~215 (and 211~215 for reversed relay activation) are used for GPI connection to monitor User Defined Input (UDI-1-UDI-5) respectively.	DST
		Relay 2	r2.	1	109	2		
		Relay 3	r3.	NA	NA	NA		
		Relay 4	r4.	NA	NA	NA		
		Relay 5	r5.	1	109	5		
		Relay 6	r6.	NA	NA	NA		
		Relay 7	r7.	NA	NA	NA		
11	Expansion IO (When Fitted and Enabled)	GPI 1-1	I1	0	115	0	Refer to Menu 9 and 10 for GPI and Relay Configuration.	DST
		Relay1-1	01.	01	47	02		
		Relay1-2	02.	01	47	03		
		Relay1-3	03.	01	47	04		
		Relay1-4	04.	01	47	05		
12	Device Relay Test	Relay 1	r1..	OFF	ON	OFF	When the selected relay is set to ON or OFF, the relay will be activated or de-activated to check if the relay connected device action is correct. For example, If relay 5 is fire 1 and connected to fire alarm system. Setting relay 5 to ON should have proper indications on the fire alarm panel. Setting All (All Relays) to ON, all relays will be activated.	ADM
		Relay 2	r2.	NA	NA	NA		
		Relay 3	r3.	NA	NA	NA		
		Relay 4	r4.	NA	NA	NA		
		Relay 5	r5.	OFF	ON	OFF		
		Relay 6	r6.	NA	NA	NA		
		Relay 7	r7.	NA	NA	NA		
		All	AL.	OFF	ON	ON		
13	Expansion IO Relay Test	Relay 1	01.	OFF	ON	ON	Refer to Menu 12.	ADM
		Relay 2	02.	OFF	ON	ON		
		Relay 3	03.	OFF	ON	ON		
		Relay 4	04.	OFF	ON	ON		
14	Date & Time	YYYY/Year	yy.	2000	2099	2010	It is important that the time and date be set up correctly on the controller's internal calendar/clock because it uses this information to store events in the event log.	ADM
		MM/Month	NN.	01	12	05		
		DD/Day	dd.	01	31	18		
		HH/Hour	HH.	01	23	19		
		MM/Minute	nn.	00	59	36		
		SS/Second	SS.	00	59	0		

11. Parameter functions

ITEM	MENU	PARAMETER	LEAD NO.	MIN	MAX	DFT	DESCRIPTION	ACCESS LEVEL
15	System	Address	Ad.	1	250	250	Setting the device RS485 address. A device must have a unique address on the network.	ADM
		Baud Rate	Br.	2.4	115.2	19.2	RS485 Baud Rate 2.4/4.8/9.6/19.2/38.4/115.2K.	DST
		Factory Default	dF.	OFF	ON	OFF	Setting the function to ON will restore the device to the factory default settings. However, the device address will not be affected to prevent from unwanted network error.	
		Password	PS.	0	2	1	When this function is set to ON it requires a password to enter the Program Mode and has the right to change settings. Setting this function to OFF it requires no password to enter the Program Mode and can only view the settings.	
16	Log	Log Enable	SN.	OFF	ON	ON	Setting this function to ON enables the smoke/flow log. There are two selectable log modes, CHANGE and RATE, where 0 is CHANGE and 1 is RATE. When the log mode "CHANGE" is selected the following change function sets the following change percentage of the detection full scale: 0.01%, 0.05%, 0.1%, 0.2%, 0.5%, 1%, 2%, 5%. When the log mode "RATE" is selected the following function sets the following log rate in seconds: 1, 10, 60, 300, 600, 1200, 1800, 3600. **NOTE:** For the smoke change, the detection full scale is the bargraph full scale, which is the same as Fire 1 Level. For the flow change it's 200%, the maximum flow reading in percentage.	ADM
		Log Mode	Cr.	0	1	0		
		Change/ Rate	LC./ Lt.	0.01/ 1	5/ 3600	5/ 3600		

11. Parameter functions

ITEM	MENU	PARAMETER	LEAD NO.	MIN	MAX	DFT	DESCRIPTION	ACCESS LEVEL
17	Scale	Mean Period	rt.	15	480	60	This value is the period used to calculate the mean of smoke background level in this period. The mean period is selectable between the following values in minute: 15, 60, 12, 240, 480.	DST
		Fast Learn	FL.	0	2	0	When Fast Learn is 0, the power-on smoke background learning time is 2 minutes. Set to 1 the time will be reduced to 10 seconds. Set to 2 will use current smoke level as the new background.	
		Sensitivity Mode 1	S1.	0.1	10.0	1.0	Setting this function to increase or decrease the smoke detection sensitivity by multiple this value to the original smoke alarm thresholds when relevant GPI is activated. This setting must work with the GPI which is set to Sensitivity Mode 1 or 2. If this function value is set to be less than 1.0, the smoke detection becomes more sensitive. On the other hand, it becomes less sensitive if this function value is set to more than 1.0. This function is usually used when different smoke detection sensitivity is required in certain situations. For example, in work hours the smoke background level increases due to all kinds of production activities. It may be desirable to have lower sensitivity in work hours and have higher sensitivity in non-working hours. Or when there're pollutants outside the detection zone causing false alarms, it can be solved by decrease the sensitivity by using another Sensis device to detect the pollutant level and connect its relay to the GPI of the Sensis device in the detection zone.	
		Sensitivity Mode 2	S2.	0.1	10.0	1.0		
		Reference Detector Address	rA.	0	250	0	Setting the reference detector address number between 1 and 250 to enable referencing. When this function is set to 0 the referencing is disabled.	
		Reference Zone	rP.	1	8	1	The zone (detector) number of above reference detector address.	
		Reference Dilution	rd.	1	100	100	The value set with this function is the percentage reference signal subtracted from the detector's signal, if a reference device has been allocated.	
		Reference Delay	rt.	0	100	0	This value is the delay time (in seconds) between a buildup of pollution being seen by the reference (if used) and the pollution being seen by the detector.	
18	SW Version.	Model	HN.				Read only.	USR
		Controller	SC.				Read only.	
		Display	Sd.				Read only.	
		Serial No.	SN.				Read only.	
19	Reserved						NA	
20	Optional Module	Zone Used	OP.	OFF	ON	ON		DST
		Display Used	Od.	OFF	ON	OFF		
		Filter Used	OF.	OFF	ON	OFF		
		Sensor Used	OS.	OFF	ON	OFF		
		Exp. 10 Used	Or.	OFF	ON	OFF		

11. Parameter functions

ITEM	MENU	PARAMETER	LEAD NO.	MIN	MAX	DFT	DESCRIPTION	ACCESS LEVEL
21	Temperature	Enable	EN.	0	2	2	0: Disable (No Display and alarm). 1: Enable (Display value and able to trigger alarm). 2: Read Only (Display value but no able to trigger).	
		Range	r.			100	Read Only, the maximum sensor detection value.	
		Resolution	Pt.			1	Read Only, the decimal points of the sensor reading. Value 1 indicates the resolution is 1 decimal place.	
		Calibration	CA.	NA	NA	NA		
		High	H.	-40	125	58	Fixed temperature heat detector generates an alarm condition if the temperature within the protected area reaches the temperature alarm threshold (°C). **Typical Fixed Temperature:** Class A1: 58°C Class A2: 62°C Class B: 77°C 0: Disable Fixed Temperature Alarm	
		Rate of Rise	rr.	0	15	10	Rate-of-Rise (ROR) heat detectors operate on a rapid rise in temperature of 6.7 to 8.3°C (12° to 15°F) increase per minute, irrespective of the starting temperature. 0: Disable Rate of Rise Temperature Alarm.	
		Time Delay	td.	0	60	10		
		Fire 2 Logic	OL.	0	3	0	0: None, 1: AND, 2: OR, 3: NOT	
		Output ID	OI	7	9	7	The Sensor Output ID is used to assign the relay output when the sensor goes into alarm. It must work with Relay Configuration to set the designated relay to the Output ID so the relay will activate when the sensor is in alarm condition.	
22	Humidity	Enable	EN.	0	2	2	0: Disable (No Display and alarm). 1: Enable (Display value and able to trigger alarm). 2: Read Only (Display value but no able to trigger).	
		Range	r.			100	Read Only, the maximum sensor detection value.	
		Resolution	Pt.			1	Read Only, the decimal points of the sensor reading. Value 1 indicates the resolution is 1 decimal place.	
		Calibration	CA.	NA	NA	NA		
		High	H.	0	100	80		
		Rate of Rise	rr.	0	100	20	The set value Rate increase per minute will trigger alarm.	
		Time Delay	td.	0	60	10		
		Fire 2 Logic	OL.	0	3	0	0: None, 1: AND, 2: OR, 3: NOT, refer to menu 21 for details.	
		Output ID	OI	7	9	7	The Sensor Output ID is used to assign the relay output when the sensor goes into alarm. It must work with Relay Configuration to set the designated relay to the Output ID so the relay will activate when the sensor is in alarm condition.	
23	Reserved							
24	Reserved							

Access level

- DST: Distributor access level, full access authorization for commissioning purpose.
- ADM: Management access level, limited access authorization for user's management purpose.
- USR: User access level, read only and can't change parameters.

12. Commissioning

Before commissioning the detector the local standards of aspirating detection systems must be consulted. These standards differ widely throughout the world and specific advice for the market in one country may not be applicable to another.

Commissioning strategy will initially depend upon the environment in which the detector is installed. For instance, the test for a computer room (which should be a relatively clean environment) would be very different from, say, a tobacco factory, which would probably have a high level of airborne particulate content.

A widely accepted standard for computer rooms/IDC areas is British Standard BS6266 and also the NFPA 76, equipment overheating at a stage well before combustion. To perform the test electrically overload a 1-meter length of PVC insulated wire of 10/0.1mm gauge for one minute using an appropriate power supply. The detector has two minutes from the end of the wire burn to give an alarm indication.

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

Commissioning check list

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

COMMISSIONING CHECK LIST	
✔	Before powering up the detector, visually check all cabling to ensure correct connection. If wire identification is not immediately clear (e.g. by use of different coloured wires or wire identification sleeves) an electrical check should be made. Any damage caused by misconnection of the detector is not covered by warranty.
✔	Power up the unit and enter the engineering access code.
✔	Enter the Setup menu and verify that the time and date are correct.
✔	Set the appropriate alarm levels and time delays for the protected environment.
✔	Modify necessary settings in your application and exit program mode.
✔	Introduce smoke to every pipe end to make sure the maximum transport time is within specification. Typical maximum transport time per NFPA 72 is 120 seconds. Other transport time requirement should be specified considered in the design stage.
✔	Perform any necessary smoke tests, like Hot Wire performance test or Potassium Chlorate / Lactose performance test, ensuring that the Detector reacts appropriately, and let the smoke fully dissipate.

NOTE:

1. If the device is connected to SensisNet Management System (SMS), the date and time can be synchronized to the computer date and time. All the devices on the network can be synchronized by SMS at the same time.

2. Set the time delays temporarily to 0 second when testing the transport time is appropriate to eliminate the alarm delay time in counting the response time. However, the time delays should be set to its appropriate value after the tests.

3. The maximum transport time may be specified to 90 or 60 seconds when early warning or very early warning fire detection is the required performance.

13. Maintenance

Filter maintenance and replacement

The Sensis Cobalt is a very low maintenance detection system. If required, external cleaning of the unit should be performed using a damp (not wet) cloth. Do not use solvents as these may mar the display bezel. The only part that may require field replacement during servicing is the inline dust filter (when this is equipped and enable in the menu). The inline filter condition can be checked from the status screen of the mini display, which gives a percentage reading of filter efficiency and the filter expired due date. When the level drops to 70% or the date is due the detector will signal a Filter Renew fault and the filter will need replacing.

When the replacement filter is fitted, enter the setup menu to set a new filter. When new filter is set, a filter flow calibration process will be initiated to learn the flow rate passing through the new filter. The filter due date will also be set to two years from the date changing the new filter.

Preventive maintenance

To guarantee the best performance of the Sensis aspirating detection system, a periodic preventive maintenance is required. The PM schedule is as follows:

CONTENT	MONTHLY	QUARTERLY	EVERY 6 MONTHS	EVERY YEAR	EVERY 2 YEARS
Power supply check	V	V	V	V	V
Display check	V	V	V	V	V
Air flow check	V	V	V	V	V
End cap test		V	V	V	V
Sampling pipes inspection			V	V	V
Signaling inspection				V	V
Clean sampling pipework				V	

There are monthly inspection, quarterly inspection, 6 months inspection, yearly inspection and two years inspection schedules for the Sensis aspirating smoke detection systems. It is recommended that monthly inspection is done by the user and all the others are performed by the trained professional personnel or companies.

It should be checked that there have been no unauthorised changes to the system configuration (e.g. Sensitivity). If changes are required or have taken place, then these must be documented.

13. Maintenance

Check the power supply (UPS)

a. Check the DC input voltage using a meter to make sure the power is within normal range.

Check the device display

a. Press the **TEST** button (if it's enabled) to check if all the LEDs on the display illuminates normally.

Check the air flow

a. Use Sensis front panel display or SensisTool computer software to check and record the airflow readings.

b. Compare the reading to history record to see if there's significant change. Airflow reading during maintenance should be confirmed as ± 20% of the values measured at commissioning.

c. Inspect the sampling pipe to see if there is pipe breakage or hole blockage if there's significant change in readings.

End cap smoke test

a. Introduce smoke to the pipe end.

b. Check the response time is within specification (typically 120 seconds) and compare this to the values previously measured. Measurements of transport time from the furthest hole during maintenance should be confirmed to be within ± 15% or ± 3 seconds, whichever is the greater, of the same measurement taken at commissioning.

c. Inspect the pipework if there is significant change in the response time.

Sampling pipes inspection

a. Check there are no obstructions affecting sampling pipework, sampling points or remote capillaries.

b. Visually check that there is no pipe breakage or sampling point blockage.

c. Check remote sampling points to make sure that capillary tubes are securely connected.

Signaling inspection

To verify the connections between the Aspirating Smoke Detection system and other connected systems (e.g. CIE, BMS).

a. Activate the fire relays in the relay test menu or introduce smoke to put the Detector into alarm to check if an alarm is generated on the fire alarm panel (if the Detector is connected to the fire alarm system).

b. Activate the fault relay in the relay test menu or put the Detector into fault (e.g. pull out the sampling pipe to generate flow fault) to check if a fault is generated on the fire alarm panel, if it is connected to the fire alarm system.

c. Shut down the main power supply. Check if the power supply backup output and its display function correctly. Check if there is a fault generated on the Sensis device if the mains or power fault monitoring GPI is connected. Check if there is a fault generated on the fire alarm panel and if the fault relay is connected to the fire alarm system.

d. Disconnect the negative wire (black) of the power supply batteries. Check if the power supply and its display function correctly. Check if there is a fault indicated on the Sensis device, and if the battery or power fault GPI is connected.

Clean the sampling pipework

a. The sampling point can be cleaned using a proper tool (e.g. a toothpick or sharp needle) to remove the dust build-up on the sampling hole.

b. To clean the capillary tube, remove the tube from the pipe and use compressed air to blow the dust away.

c. To clean the whole sampling pipework system, a pipe must be removed from the pipe inlet and a high airflow introduced by a compressor into the sampling pipe, to remove any dust particles found inside the pipework and/or within the sampling holes. Alternatively, for ease of maintenance, install a three-way valve upstream of the pipe inlet. During normal operation, ensure that the valve connects the Detector pipe and the sampling pipe. Connect the compressor to the third inlet of the valve, so that the high airflow can be directed to the sampling pipe during maintenance. (Isolate the Detector zone prior to pipe cleaning to prevent any nuisance alarms.)