Ampac

Fire detection and evacuation solutions that save lives.



Indigo CSD-H Series Cabinet Smoke Detector

User Guide

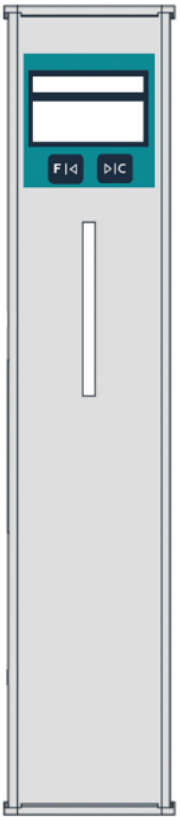
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Contents

1. Introduction 3
2. Features 4
3. Specification 5
4. Remote Display Unit (optional) 7
5. Indigo CSD-H accessories 8
6. In-cabinet sampling design 10
7. Typical Indigo CSD-H installations 11
8. Networking 13
9. Mechanical installation 14
10. Indigo CSD-H display orientation 15
11. Panel-mounted RDU installation 16
12. Electrical installation 17
13. Operation 21
14. Display 24
15. Programmer 27
16. Parameter Functions 28
17. Commissioning 35
18. Maintenance 36

1. Introduction



Aspiris Indigo CSD-H is an aspirating smoke detector for in-cabinet detection and small areas up to 100m^2.

Most early warning aspirating smoke detectors are designed to protect a large area, for example, a full fire zone of up to two thousand square meters. Typically, air sampling systems utilize many sampling holes over large areas, which means that identifying the source of smoke in a large open space is relatively straightforward. However, smoke that is generated in a closed equipment cabinet or concealed space can be challenging to identify. Deploying the Aspiris Indigo directly to the risk alleviates such problems and allows detection within critical spaces with pinpoint accuracy. This enables operators to quickly manage the situation at source.

The design of the Indigo CSD-H aims to protect a small number of cabinets. In fact, it is recommended to use one Indigo per cabinet. In this case, every cabinet is specifically monitored allowing speedy identification of the source of smoke and intervention required.

2. Features

Indigo CSD-H uses High Power Blue LED as the detection light source. Blue light technology is very sensitive to small smoke particles generated during the incipient stage of a fire, at which time the smoke is invisible to human eyes. The highest alarm sensitivity of the Indigo CSD-H is 0.1%/m, which is 50 times more sensitive than a conventional point type smoke detector.

FEATURES
Smoke detection range: 0.02~25%/m
Fire 1 alarm sensitivity: 0.1~12.5%/m
Four alarm levels: Alert, Action, Fire1, Fire2
Up to 40 m capillary tube/pipe total length, most applications will use rigid pipe not flexible.
Up to 4 sampling holes
2 relay outputs
Mini 3-in-1 display
CO sensor (optional)
3-in-1 control/display/programmer remote display (Optional)
RS485 network
Supports Modbus RTU open protocol

3. Specification

INDIGO CSD SERIES	
Sensitivity	High Sensitivity
Smoke sensor	0.02%/m Smoke Sensor
CO sensor	CSD - H11 only

SPECIFICATION	INDIGO CSD-H10	INDIGO CSD-H11
Smoke detection light source	High power blue LED	
Smoke detection principle	Forward light scattering mass detection	
Smoke detection range	0.02~25%/m	
Alarm sensitivity	0.1~ 12.5%/m	
Sampling pipe/tube	Pipe: OD 25 mm; Capillary tube: OD 8 mm	
Max. capillary tube/pipe length	30 m*	
Max. no. of sampling holes (Class A/B/C)	2/4/4*	
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 (4 digit)	
LED indicators	5-color (Green/Yellow/Blue/Red/Purple) status bar	
Alarm strobe	Yes	
Alarm flashing mode	Slow, Fast, Burst	
Environment smoke learning	24 hours, 365 days non-stop environmental background level learning	
Flow detection principle	Heat mass detection	
Flow monitoring	• Pipe flow normalized to 100% • Flow high and low flow faults • Adjustable flow detection sensitivity • Adjustable flow fault threshold	
Aspirator	Yes	
Aspirator speed adjustment	10	
CO sensor	H10 - No	H11 - Yes
CO detection range	NA	0-1000 ppm
Relay output	2 relays (configurable) Rating: 2A @ 30 Vdc	
General purpose inputs **NOTE:** UDI, - User Defined input	1 x GPI (configurable) **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 Indigo CSD: 1.2 km • Supports Modbus RTU open protocol	
Event logs	• Number of Events: 180,000 • Event type: Alarm/Fault/Operation/Smoke/Flow/Auxiliary Sensors	
Voltage	9.6~28.8 Vdc	
Current @24V	71 mA	
Dimension	100(h) x 227.3(w) x 47.8(d) mm (4"(h) x 9"(w) x 2"(d))	
Weight	0.725 kg	
Operating conditions	• Ambient temperature: 0 ~ 40°C • Sampling air temperature: -20 ~ 60°C • Humidity: 10~95% RH non-condensing	

IMPORTANT NOTES:

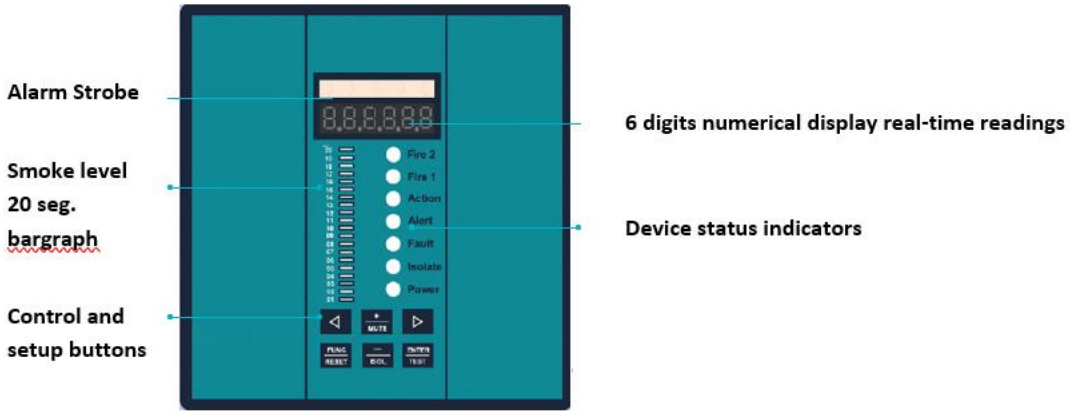
Per AS7240-20, the sampling pipes and fittings shall have adequate mechanical strength and temperature resistance in accordance with AS1670.

Per AS1670 the power for the aspirating smoke detector shall be supplied by a power supply with battery backup. This power supply may be common to the control and indicating equipment

Voltage range under approval test condition is 19.6- 28.8 Vdc.

4. Remote Display Unit (optional)

Indigo CSD-H can be connected to a Remote Display Unit (RDU) for the control, display and configuration of the detection device. When the Indigo CSD-H is installed inside a cabinet or at a remote location, the RDU can be installed at a convenient location for easy operation.



Panel mounted
Remote Display Unit

RDU function

CONTROL	<RESET> <ISOLATE> <MUTE> & <TEST> BUTTONS
Display	• Alarm strobe • 20 segment smoke level bargraph • **6-digit numerical LED display** – Real-time smoke level – Real-time airflow level: raw and normalized flow – Device address – Active event & codes • **LED indicators** – Alarm indicator: Alert, Action, Fire 1, Fire 2 – Fault indicator – Isolated indicator • Buzzer
Programmer	• Access controlled by password. • Bargraph and 6-digit numerical LED displays the functions. • <Func.> <ï><ð> <+> <-> <Enter> buttons to change settings.
Expansion IO (optional)	3 relays (configurable) 1 General Purpose Input (configurable)

5. Indigo CSD-H accessories

Flow Splitter

The Flow Splitter is mounted inside the Indigo CSD-H inlet port to provide a filtered branch flow, which is a small percentage of the total air sample to go through the detection chamber.



Indigo CSD-H Flow Splitter

The Flow Splitter will work in most installations. However, if the flow rate is extremely small, i.e., when it is installed with a capillary sampling tube of an ASD system. A cap can be mounted to the flow out opening so that 100% of air samples will go into the detection chamber.



Capped Flow Splitter to direct all the air sampled through the Indigo CSD-H detection chamber

The Flow Splitter (uncapped) is mounted in the Indigo CSD-H inlet port. When it needs to be capped, use needle-nose pliers to remove the Flow Splitter. If required the plug-in cap can be found in the accessory kit.

NOTE: When the Flow Splitter is taken out, care must be taken to keep the same position when it is refitted The opening of the splitter must face upwards so that the flow passes into the detection chamber. Failure to check this will compromise the systems detection capability.

Capillary Tube Adaptor

The Indigo CSD-H uses removable Capillary Tube adaptors that can be installed or removed from the air inlet or outlet port depending on the application. When the adaptor is not mounted, it can be connected to a 25 mm air-sampling pipe. This design makes the Indigo CSD-H compatible with flexible capillary tubing (ideal for equipment protection) and also provides the option to use typical 25 mm pipe found in ASD systems.



The Capillary Tube Adaptors, mounted in the Indigo CSD-H air sample inlet and outlet port

Two Capillary Tube Adaptors come with the package. One is mounted to the Inlet Port, the other to the exhaust port.

The Adaptor's connect to capillary tube with an OD of 8mm. Other capillary tube OD like 10 mm, 6 mm are also available upon request.

In-Line Filter

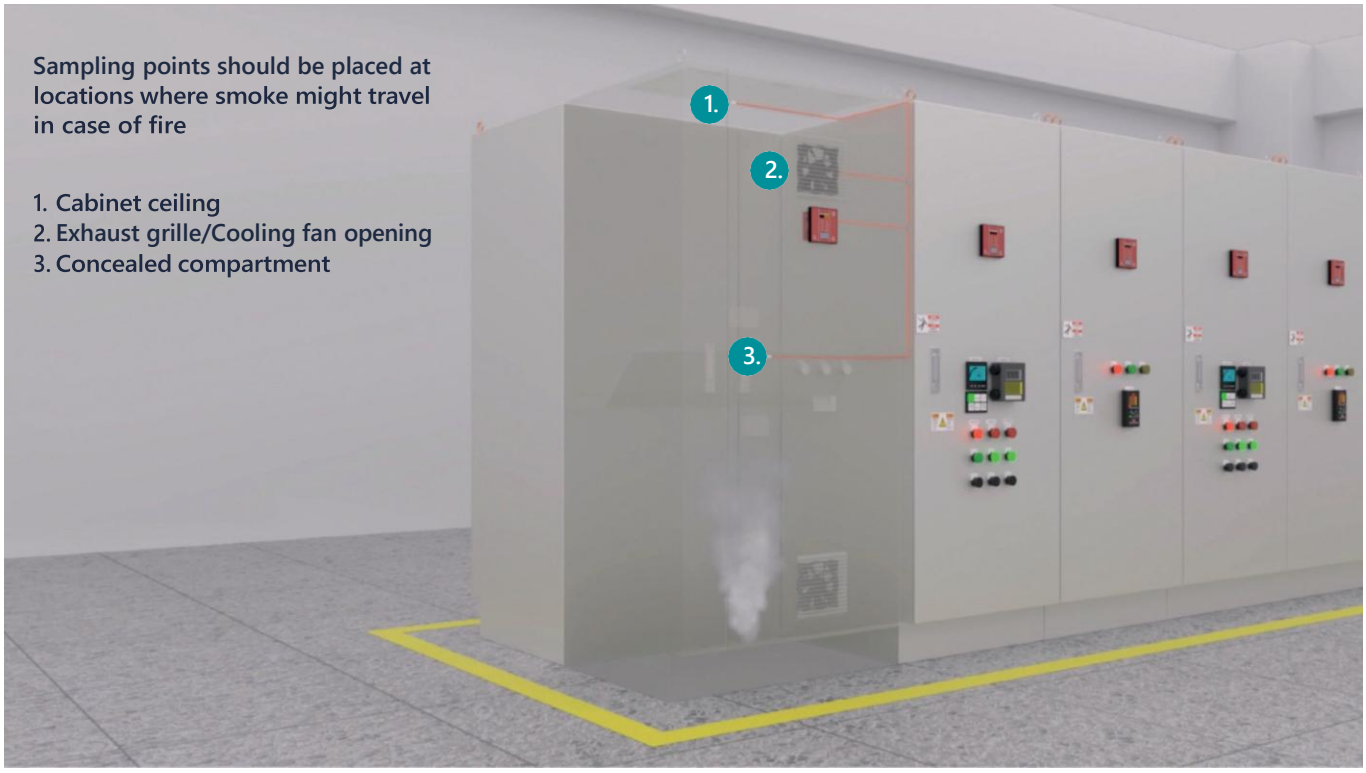
It is highly recommended to install an additional In-Line Filter. In harsh environments, it is essential to have an additional In-Line Filter working with the Indigo CSD-H to enhance the detectors longevity. Different inlet and outlet port options of the In-Line Filter are available for specific pipe or capillary tube installation.



Aspiris In-line Filters for 25 mm pipe and capillary tube

6. In-cabinet sampling design

The Indigo CSD-H is designed for cabinet/equipment fire detection. There are several possible locations for sampling the air inside the protected cabinet/equipment where the fire originates.

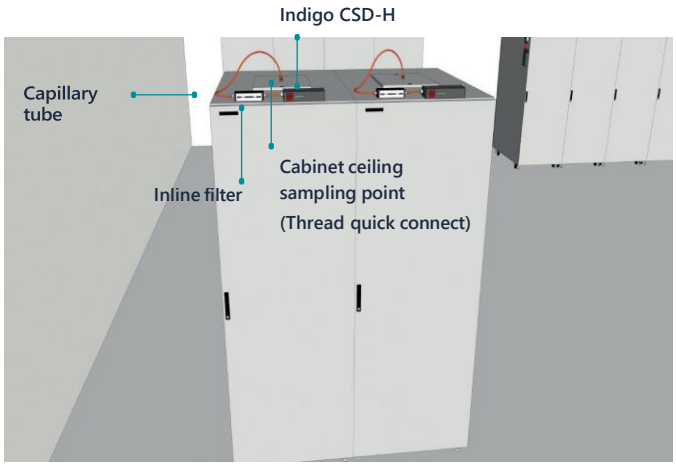


Design considerations

- Sampling points should be located where smoke might travel to: Suitable locations are Cabinet Ceiling and Exhaust Grille/Cooling Fan Opening. If there is a concealed compartment where smoke could be contained, there should be an additional sampling point installed.
- Pinpoint addressability: A typical ASD system detects smoke from multiple equipment cabinets, making it difficult to search and identify the fire origin. As the Indigo CSD-H is designed for individual cabinet/equipment fire detection. It is recommended to have an individual Indigo CSD-H to protect one cabinet to pinpoint the location of the fire.

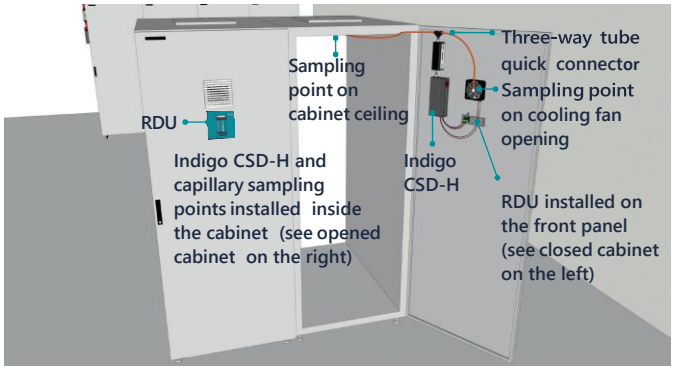
7. Typical Indigo CSD-H installations

1. In-cabinet sampling with Indigo CSD-H installed on the top of cabinet.



The sampling point is mounted on top of the cabinet/ equipment. The Indigo CSD-H is mounted on top to display the real time detection value and alarm/fault conditions.

2. In-cabinet sampling with Indigo CSD-H installed inside the cabinet.



The Indigo CSD-H can be mounted at any convenient location with the capillary tube connected to the sampling point on the cabinet ceiling. When the cabinet/equipment is equipped with an exhaust fan for cooling, there should be an additional sampling point at the fan opening. A 3-way tube quick connector can be used to provide the branch tube to the cabinet ceiling and exhaust fan opening.

When the Indigo CSD-H is installed inside the cabinet, you are not able to see the display value and alarm conditions as you would if the Indigo CSD-H is installed on top of the cabinet. It is recommended to have a panel mounted RDU connected to display, control and program the Indigo CSD-H inside.

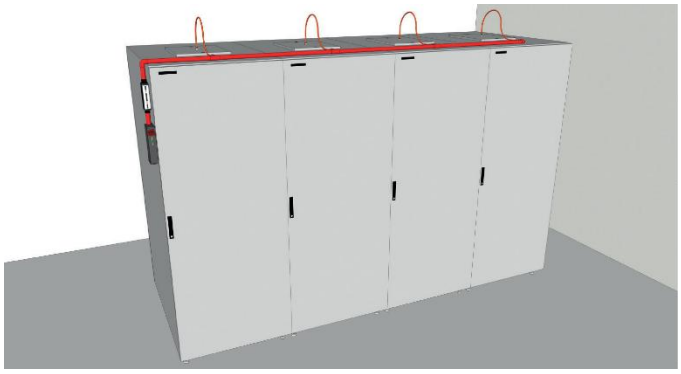
3. Multiple cabinets in-cabinet sampling using capillary tube.



When pinpoint addressability is not crucial, the Indigo CSD-H can be designed to protect multiple cabinets. In this case the Indigo CSD-H can be mounted on the top of the cabinet with capillary tubes connected and branched to the sampling point located at the top of each protected cabinet.

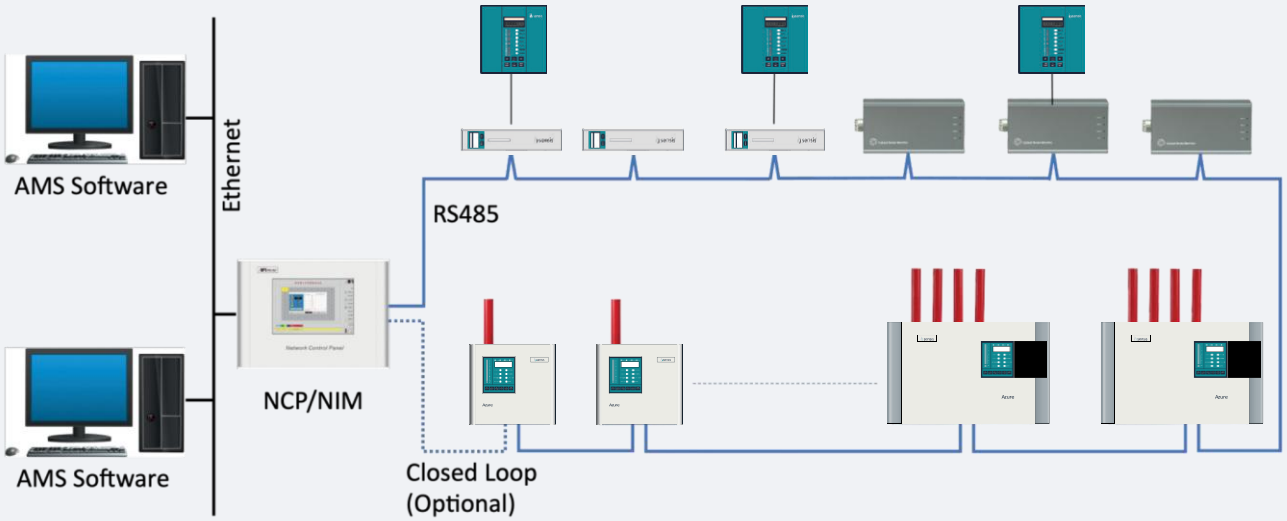
NOTE: There is a maximum of four sampling points for one Indigo CSD-H. Care should be taken when an additional sampling point is required at the exhaust fan opening or at an independent compartment.

4. Multiple cabinets in-cabinet sampling using 25mm pipe.



It's also possible to use a 25 mm pipe to connect the capillary sampling points like a typical Aspirating Smoke Detection System. When this is desired, the Indigo CSD-H can be installed on the side of cabinet or on the wall nearby. A maximum of 4 samplings points can be connected to one Indigo CSD-H.

8. Networking



Aspiris network structure

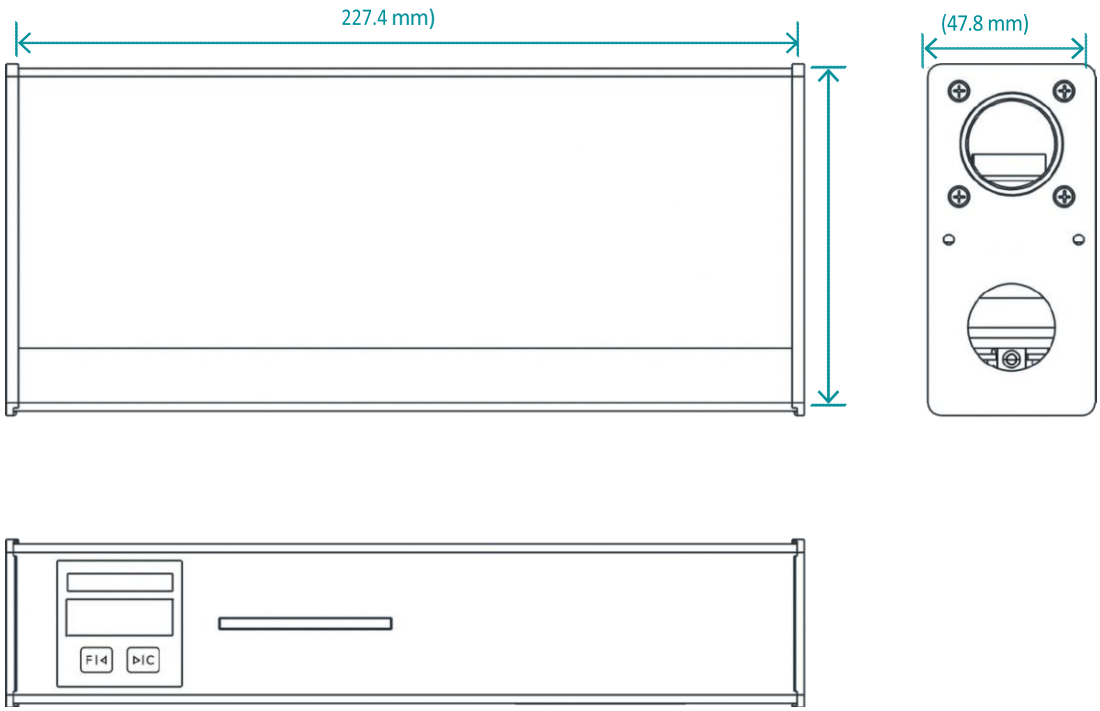
The Indigo CSD-H features an RS485 network option for connecting to the AspirisNet Control Panel (NCP), AspirisNet Interface Module (NIM) or AspirisNet Management Software (AMS) running on PCs for centeralized monitoring of the Aspiris devices on the network.

The maximum RS485 cable length of Indigo CSD-H detectors on the network is 1.2 km in total. However, the cable length can be extended by another 1.2 km if connected with an RS485 repeater or a Aspiris Azure ASD unit, which has a built-in repeater in its circuit.

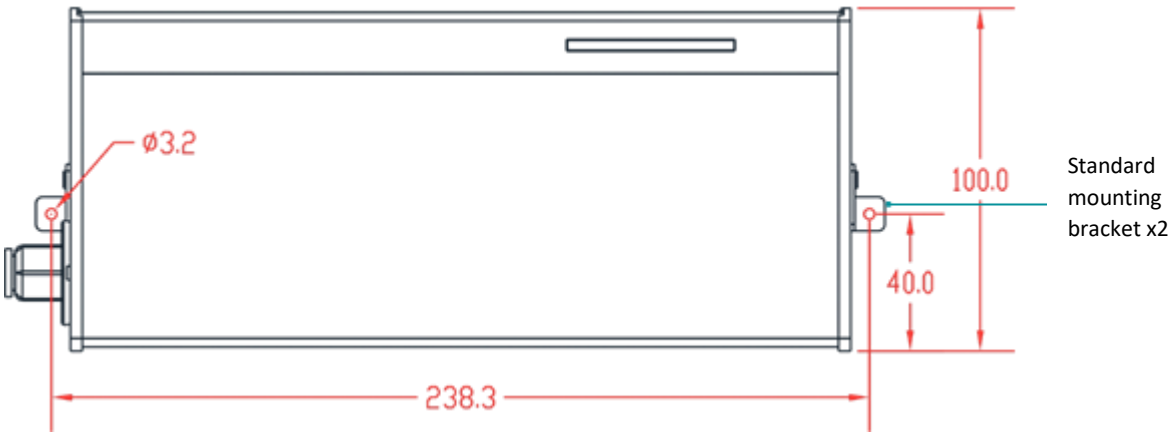
The Indigo CSD-H RS485 network can also be connected to the AspirisTool configuration and Diagnostic Software running on a PC for commissioning.

The Indigo CSD-H RS485 network supports the Modbus RTU open protocol for which a register definition table is available on request. This makes Indigo CSD-H very easy and economical to integrate with SCADA, PLC or HMI without increasing the cost.

9. Mechanical installation



Indigo CSD-H dimensions

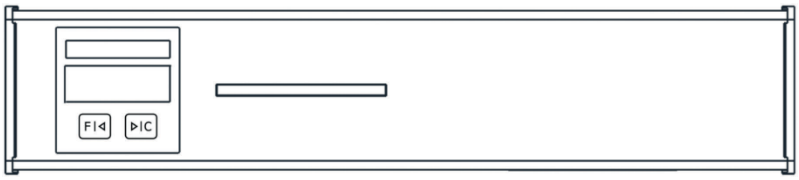


Indigo CSD-H mounting position

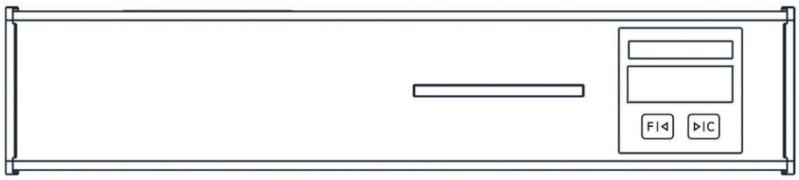
NOTE: It is recommended that the installation is carried out by suitably experienced and trained personnel.

10. Indigo CSD-H display orientation

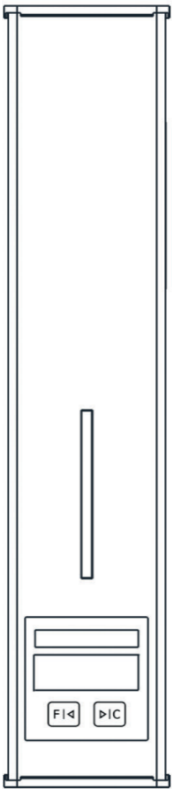
The Indigo CSD-H mini-display is designed to be rotatable. It can rotate by 90°, 180° or 270° depending on the installation. To change the orientation, open the front cover, loosen the two screws on the top and bottom side of the Mini-Display, remove and rotate the display to the desired angle, refit the display and replace the screws.



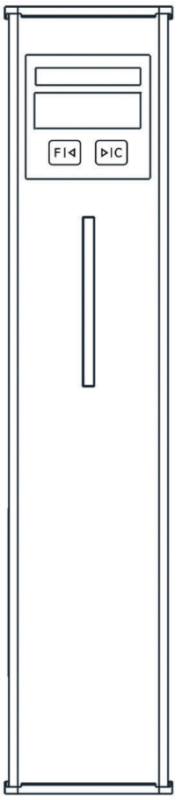
Mini-display orientation: 0°
Air sample inlet on the left side.
Wiring entrance on the right side.



Mini-display orientation: 180°
Air sample inlet on the right side.
Wiring entrance on the left side.



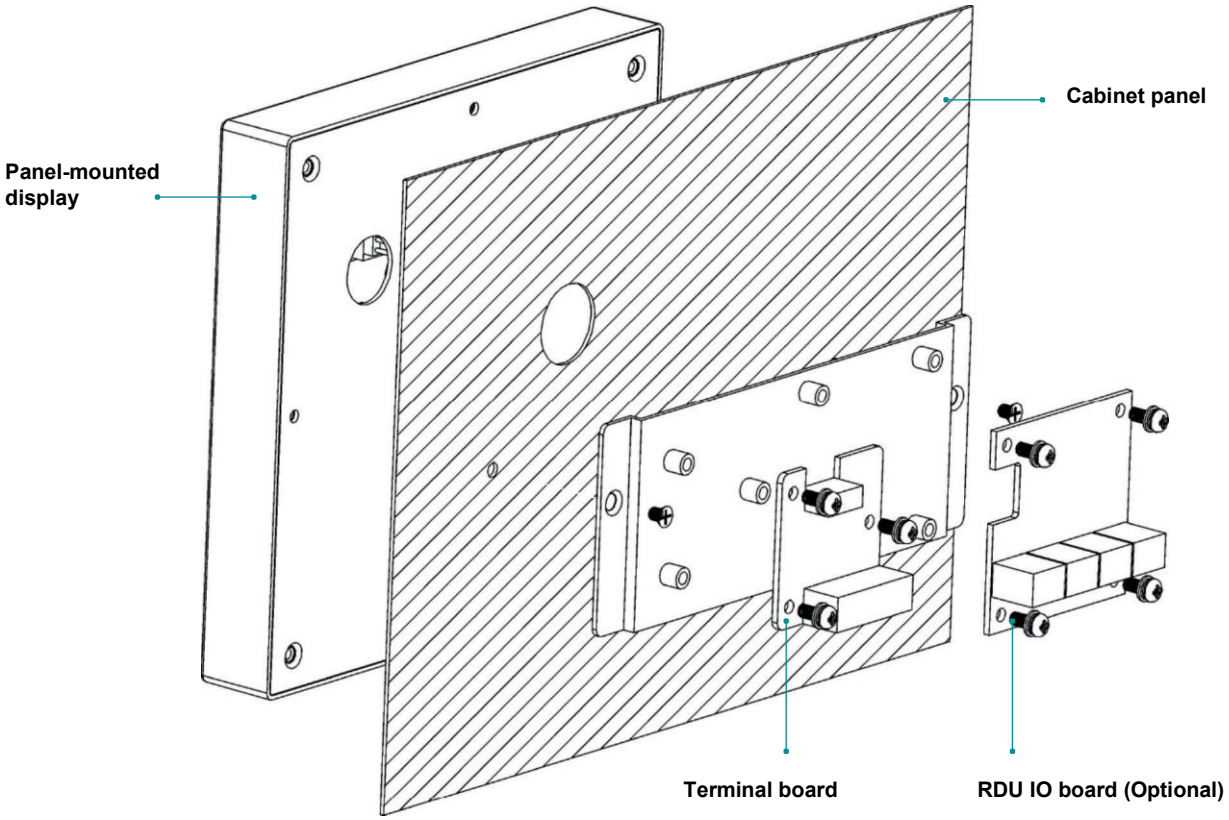
Mini-display orientation: 90°
Air sample inlet on the top side.
Wiring entrance on the down side.



Mini-display orientation: 270°
Air sample inlet on the down side.
Wiring entrance on the up side.

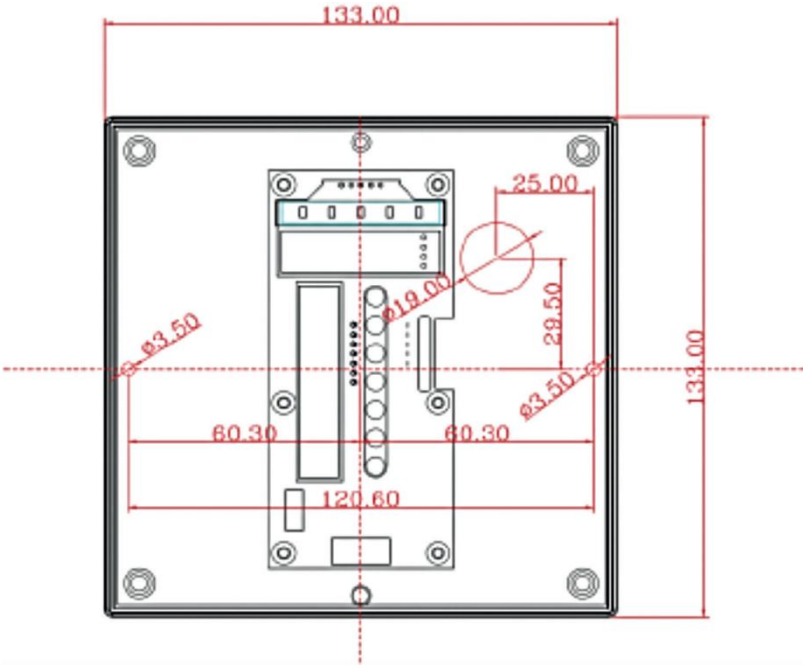
11. Panel-mounted RDU installation

Mounting of panel-mounted display



Installation of panel-mounted display

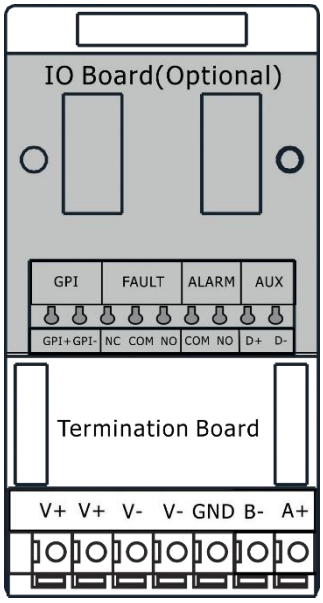
The two small holes (ø3.5 mm) in red are for the screws to mount the RDU. The larger hole (ø19 mm) is for the cables. The three holes must be drilled on the cabinet panel.



12. Electrical installation

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

Wiring terminals



Indigo CSD-H wiring terminals definition

TERMINAL ASSIGNMENT	DESCRIPTION
Vdc	Power input: 9.6~28.8 Vdc
RS485	RS485 communication port
GPI	Monitor input, short the GPI input to activate the set function
RELAY	2 Relay output, default setting is Fault and Fire-1 signal
AUX	Connect to auxiliary module such as RDU and Auxiliary gas sensor communication port

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

Cables

- Power & Control cable should be 0.5 mm^2 strands cable.
- RS485 network should be 22 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 (9.6~28.8) Vdc power supply. The device may be powered by any AS7240 compliant monitored 24Vdc power supply of sufficient capacity.

RS485

- One set of RS485 Terminals (GND, B-, A+)
- The maximum total cable length for all Indigo CSD-H on one 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 is a device failure, line break or line short circuit.
- AspirisNet Management System computer software can monitor all devices on the network.
- SCADA/HMI/PLC systems capable of Modbus RTU open protocol can communicate with Aspiris devices.

Relay connections

There are 2 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
Com=Common

The relay rating is 2A @ 30 Vdc. If the load connected 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 setting using the display on the front panel or the AspirisNet Management software to change the setting. However, the fault relay needs a normally closed setting to give a fail-safe output when the device is powered off.

Therefore, check the relays NO or NC contact is correct when changing relay functions.

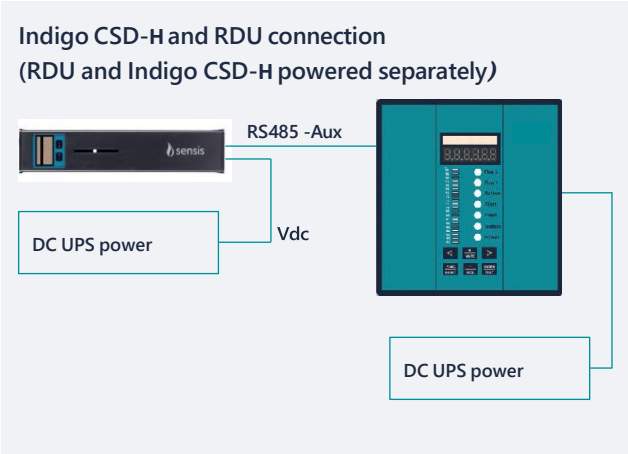
GPI, General Purpose Input

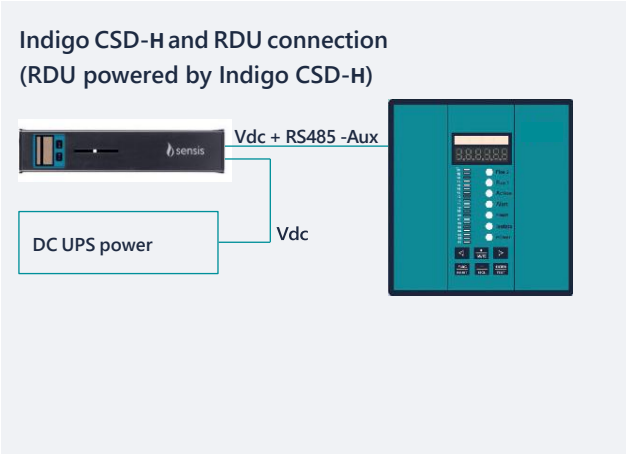
There is one General Purpose Input terminal on the Indigo CSD-H termination board. This input is designed to monitor the status of the connected devices. The connected devices monitored by the GPI can be just a button, a fault relay from the power supply, or even an alarm relay from another detector. Short-circuiting the pair of the input pins activates the function defined in the GPI settings. There are 14 possible functions in the following categories:

CATEGORIES	FUNCTIONS	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 functions 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 Aspiris detection device will signal a fault when the connected power supply relay is activated. The Aspiris fault condition can be monitored by a fire alarm system when its fault relay is connected to 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, during working hours 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 Aspiris 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.

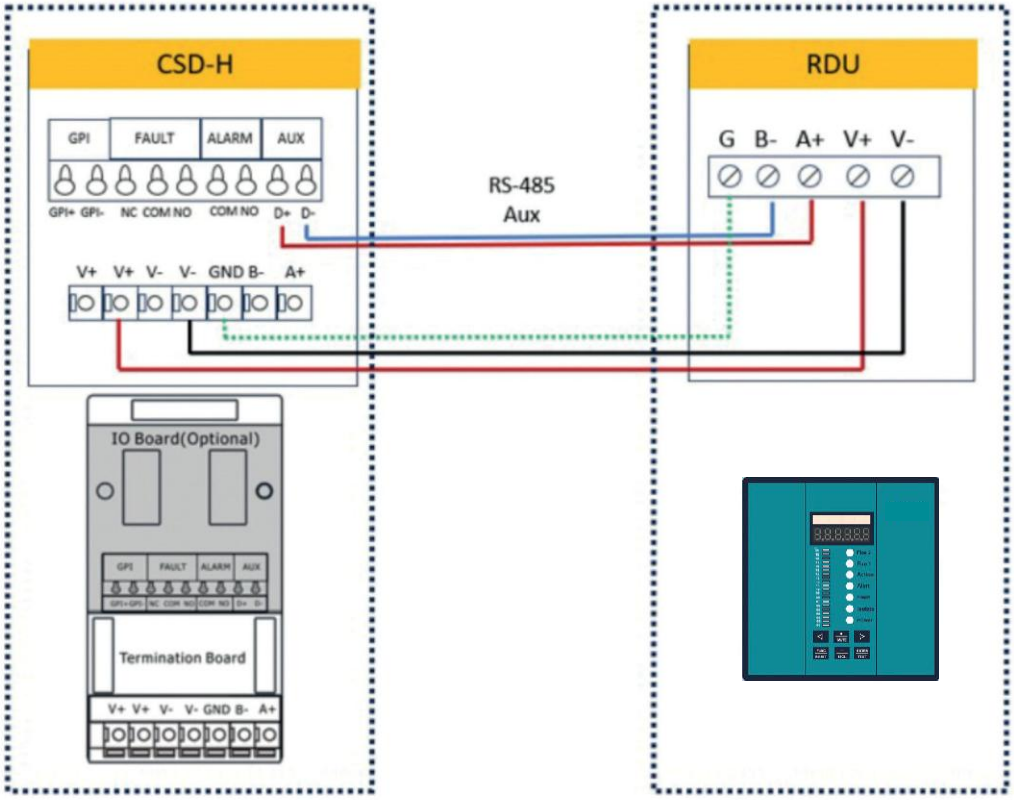
Auxilliary connections

The Power and RS485-AUX terminals on the Indigo CSD-H are the connection to auxiliary units. Auxiliary units that are currently available are RDU (Remote Display Unit), auxiliary sensors and external fan/flow unit. The Auxiliary Units can be powered from the Indigo CSD-H or separately by another power supply.



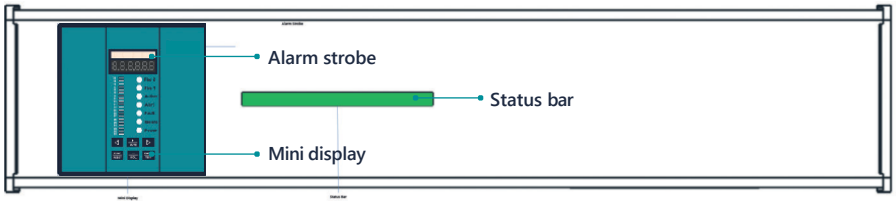


Wiring between Indigo CSD-H and RDU



13. Operation

Indigo CSD-H mini-display and status bar



The Indigo CSD-H mini-display and status bar allows the user to access the devices' operating condition, control and basic function settings. The operation of the mini-display is given in the following table**. In the table** "Press" means Press the button once and "Long Press" means press and hold the button for 2 seconds.

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 countdown time (in seconds) for the fast smoke learning to be completed.
	Flow Normalized (F)	Current normalized flow value in %. With the power on, it shows the countdown time (in seconds) for the flow normalization process to be completed (if the Auto Normalization is set to ON).
	Flow Raw	Current flow raw value
	Address (A)	Device RS485 Address
	Event (E)	When switched to Event, E__N indicates the number of active events. 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)	Current temperature in CSD-H
	Humidity (H)	Current humidity
	CO (g)	Current CO value, if equipped.
Prog. mode	Long press F|◁ under display mode to enter the programmer mode to perform the following basic function settings. NOTE: Pin codes need to be input correctly before showing the functions ---- will show waiting for the pin. Please ask authorized distributor for the pin. 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: Only Fire 1 Level, Fan Speed, RS485 Address and CO Calibration can be set using the mini display. Full function settings should be conducted using RDU or AspirisTool running on a PC. AMS or NCP also provide full function settings if it is networked.	
	Sensitivity (S)	S. 0.1~12.5
	Fan (F)	F. 0-10
	Address (N)	N.001-250
	CO (if equipped)	Zero-point calibration
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

The status bar

The status bar on the Indigo CSD-H front panel indicates the following conditions.

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

NOTE: The status bar shows only the highest-level condition when multiple conditions have occurred. The priority of the condition is Isolate > Alarm > Fault > OK. If smoke alarm and auxiliary alarm are both active, the status bar will show Red and Purple in rotation.

Alarm strobe

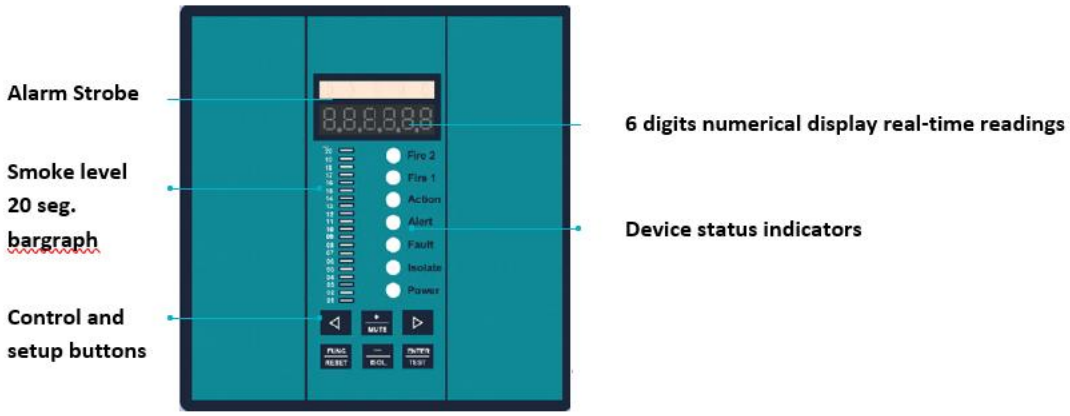
The flashing frequency options are listed below and can be changed in function settings. The alarm strobe works with the status bar to identify the alarm levels.

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 stop when the Mute button is pressed. The flash will start again when a new event occurs. Alarm strobe flashing frequency can be changed. Refer to function settings for details.

Remote display unit

The following instructions apply to panel-mounted, rack-mounted and wall mounted 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 in a cycle. The cycle repeats twice for the user to check if there is any malfunctioning LEDs.

The difference between MUTE and ISOLATE is that MUTE is for the buzzer/strobe to confirm the alarm or fault status. When a new alarm or fault occurs the buzzer/strobe will activate again; ISOLATE removes the 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 program mode. For the key functions in program mode please see the parameter settings section.

14. Display

Indicators

INDICATOR (COLOR)		DESCRIPTION
GREEN	PWR	The device is powered. Fast flash indicates the device is in Quick Smoke Learn Process. Slow flash indicates the device is in Flow Normalization Process.
BLUE	ISOL	The device is isolated
YELLOW	FAULT	Smoke detection fault Airflow Hi/Lo fault, air flow sensor failed, aspirator failed, System fault
RED	ALERT	The Alert threshold has been reached, and the appropriate time delays have expired. The detector will generate an Alert Alarm.
RED	ACTION	The Action threshold has been reached and the appropriate time delays have expired. The detector will generate an Action Alarm.
RED	FIRE 1	The Fire 1 threshold has been reached and the appropriate time delays have expired. The detector will generate a Fire 1 Alarm.
RED	FIRE 2	The Fire 2 threshold has been reached and the appropriate time delays have expired. The detector will generate a Fire 2 Alarm.
YELLOW	Bargraph	Displays the current smoke level, with full scale of Fire 1 Level
		In program mode, individual bargraph LED flashing indicates selected parameter number.

NOTE: The status of the Alarm and Fault LEDs might not represent the 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 display

In normal operation, the 6-digit numerical LED display shows the real-time smoke level, air flow level, device address and active events in occurrence. Press ◁▷ buttons on the panel to switch the display item in sequence as follows:

Smoke (S) ⇄ Flow Normalized (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 <+> <-> keys to show the detailed event message, including date, time and event code. For example, if there are two events, code E11 followed by A0, the display shows 2 when the Event option is selected. Press <+> repeatedly to display the A0 event message, the E11 event message, and the number of events again. Press <-> to show the events in reverse order. If no active event exists, the display shows NONE.

The numerical LED default display is smoke level. If it is switched from the default to other item without any action in 10 minutes, it will switch back to the default numerical value 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 /normalization indicators)
EVENT (E)	NONE A1~A14 E0~E35		
TEMPERATURE (T)	-40~125	oC	If enabled*
HUMIDITY (H)	0~100	%RH	If enabled*
CO (G)	0~1000	ppm	If equipped

NOTE: The temperature and humidity display can be disabled – refer to function settings for detail. The flashing indicators of Smoke Learning and/or Air Flow Normalizing will continue to flash when switching the numerical 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	Disables the buzzer.
1	In Alarm, beeps 1 second in every 10 seconds. In Fault, no beep.
2	In Alarm or Fault, beeps 1 second in every 10 seconds.
3	In Alarm, beeps continuously. In Fault, beeps 1 second in every 10 seconds.
4	In Alarm or Fault, 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 occurs. The alarm flashing frequency can be changed – refer to function settings for detail.

Table: Summary of key functions under operating mode

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	Normalization Failed
	E17	Filter Blockage
	E18	Filter Removed
	E19	Filter change 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 Normalization
	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 display the level of Smoke/Flow/Address/Event using numerical LEDs.

While in setting mode, the setting of related operating parameters of detecting devices can be done via keypad/Bargraph/display numerical LEDs.

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

15. Programmer

- Press and hold the <Func.> key for 2 seconds to enter into programming mode. The Bargraph 01 indicator flashes and shows setting 01 parameter with its numerical LED displaying the parameter value of 01. If the parameter of password function is set at 1 (ON), a PIN code would be required otherwise the parameters can only be read. If password was set to 0 (OFF), direct editing of 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 display will flash 3 times if successfully stored.
  NOTE: if the password function is set to 1(ON) but a PIN code has not been entered or has been entered incorrectly pressing +/- has no effect.
- The flashing segments in the bargraph represent the selected parameter number. For parameter numbers above 20 two segments will flash. for example 21 is shown by segments 20 and 01 flashing.
- If a 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 other end of the range.
- Press and hold F key for 2 seconds to exit the setting mode.
- If no action is taken for 1 minute in program mode, a 10 second countdown will be displayed before returning to operating mode.

Table: Functions of keys in program mode

KEY PAD	PRESSING KEY	EXECUTION
FUNC.	Long press	Entering or exiting 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	Rapidly reduce the value
ISOL		
+	Press	Increase the displayed value. When the value reaches the maximum, press <+> key will jump to the minimum value.
	Long press	Rapidly increase displayed value
MUTE		
ENTER	Long press	Save setting, the numerical segment flashes 3 times if successfully saved.
TEST		

16. Parameter Functions

ITEM	MENU	PARAMETER	LEAD NO.	MIN	MAX	DFT	DESCRIPTION	ACCESS LEVEL
1	Alarm Level	Full Scale Sensitivity	AF.	0.1	12.5	0.80	The Detector smoke level in %/m for the bargraph reaching its full scale (20 bars). The smaller the value, the higher the sensitivity and vice versa.	ADM
		Alert Bargraph Level	A1.	4	4	4	When the Alert Bargraph Level is reached and the appropriate time delays have occured, the detector will trigger an Alert Alarm. Action Smoke Level (%/m) = Full Scale Level/20 x Alert Bargraph Level. Using the default settings, the alert level is 0.2/20x10=0.1%/m.	
		Action Bargraph Level	A2.	12	12	12	When the Action Bargraph Level is reached and the appropriate time delays have occurred, the detector will trigger an Action Alarm. Action Smoke level (%/m) = Full Scale Level/20 x Action Bargraph Level. Using the default settings, the action level is 0.2/20x15=0.15%/m.	
		Fire 1 Bargraph Level	A3.	20	20	20	When the Fire 1 Bargraph Level is reached and the appropriate time delays have occurred, the detector will trigger a Fire 1 Alarm	
		Fire 2 Level	A4.	0.1	20.0	3.2	The Fire 2 "smoke" level in %/m. When this Smoke Level setting (in %/m) has been reached and the appropriate time delays have occurred, the detector will trigger a Fire 2 Alarm.	
2	Time Delay	Alert Delay	t1.	0	60	30	Each alarm delay is the number of seconds that an alarm level must be continuously measured 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.	N	Y	Y	Enables or disables 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	0	Increase this value to increase the flow detection sensitivity.	DST

ITEM	MENU	PARAMETER	LEAD NO.	MIN	MAX	DFT	DESCRIPTION	ACCESS LEVEL
4	Normalise Flow	Normalise	NA.	N	Y	N	Setting this function to Y 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 Indigo CSD-H and RDU (if fitted) will flash to indicate the normalisation status. After normalisation, a flow reading of greater than 100 means the current flow is higher than normal. The flow reading of less than 100 means the current flow is lower than the normal condition. **NOTE:** It is crucial to check that there is 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.	NF.	N	Y	N	Setting this function to Y will automatically start the normalisation process when the device is powered on.	
5	Alarm Action	Cascade Alarm	AC.	N	Y	Y	Setting this function to Y 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. It is possible that a high-level alarm is triggered before the lower-level alarm if the setting of high-level alarm time delay is less than the time delay of low-level alarm and the smoke level increases quickly. Enabling cascade alarm will guarantee the alarms go off step by step.	ADM
		Alarm Latch	AL.	N	Y	Y	When this function is set to Y 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 has reduced below the alarm level. This is the factory default setting. When this function is set to N, the alarm will be reset automatically when the smoke level is reduced below the alarm threshold.	
		Fault Latch	FL.	N	Y	N	When this function is set to Y it requires a reset from the front panel or a remote reset to clear fault indications. If this function is set to N, 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 must be continuously measured before the fault is initiated.	
6	Filter	Filter Status	Fs.	0	100		Read only.	
		Filter Due	Fd.	0	730		Read only.	
		New Filter	FN.	N	Y	N	Set this function to Y when a new filter is installed.	

ITEM	MENU	PARAMETER	LEAD NO.	MIN	MAX	DFT	DESCRIPTION	ACCESS LEVEL
7	Front Panel	Reset Button	dr.	N	Y	Y	The front panel buttons may be enabled or disabled individually by setting these functions to Y or N.	ADM
		Isolate Button	dl.	N	Y	Y		
		Mute Button	dS.	N	Y	Y		
		Test Button	dt.	N	Y	Y		
		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 input/output board settings. Please refer 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.	N	Y	N	This has the same effect as pressing the <RESET/ ISOLATE/SILENCE/TEST> buttons on the front panel.	ADM
		ISOLATE	CI..	N	Y	N		
		MUTE	CS.	N	Y	N		
		TEST	CT.	N	Y	N		
		Relay 1	r1.	OFF	ON	OFF	Relay test of the Display Expansion input/output board	DST
		Relay 2	r2.	OFF	ON	OFF		
		Relay 3	r3.	OFF	ON	OFF		
9	GPI	GPI-1	I1.	0	115	1	Sets the GPI terminal to the functions below: 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 Use values 101~115 to set the same functions 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

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 the outputs below: 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 relays operation 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).	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 & Enabled)	GPI 1-1	I1	0	115	0	Refer to item 9 and 10 for GPI & 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..	N	Y	N	When the selected relay is set to Y or N, 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 the fire alarm system, setting relay 5 to Y should cause a fire condition on the fire alarm panel. Setting All (All Relays) to Y, will activate all the relays.	ADM
		Relay 2	r2.	NA	NA	NA		
		Relay 3	r3.	NA	NA	NA		
		Relay 4	r4.	NA	NA	NA		
		Relay 5	r5.	N	Y	N		
		Relay 6	r6.	NA	NA	NA		
		Relay 7	r7.	NA	NA	NA		
		All	AL.	N	Y	N		
13	Expansion IO Relay Test	Relay 1	01.	OFF	ON	ON	Refer to item 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		
15	System	Address	Ad.	1	250	250	Sets 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.	N	Y	N	Setting this function to Y will restore the device to the factory default settings. However, the device address will not be affected to avoid an unwanted network error.	
		Password	PS.	N	Y	Y	When this function is set to Y, a password to enter the program mode and a user can then change settings. Setting this function to N makes the program mode accessable without a password but all settings are read only	

ITEM	MENU	PARAMETER	LEAD NO.	MIN	MAX	DFT	DESCRIPTION	ACCESS LEVEL

16	Log	Log Enable	SN.	N	Y	Y	Setting this function to Y enables the smoke/flow log. There are two selectable log modes, CHANGE and RATE. On Aspiris, *0 is "CHANGE"* and *1 is "RATE"*. When the log mode "CHANGE" is selected events are recorded if the % obsuration changes by the selected level(regardless of duration), the options are: *0.01%, 0.05%,0.1%, 0.2%, 0.5%, 1%, 2%, 5%.* When the log mode "RATE" is selected, events are recorded if they occur longer than the selected time in seconds options are: *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%, ie., twice the maximum flow rate measured.	ADM
		Log Mode	SL.	0	1	0		
		Change/ Rate	SC./ St.	0.01/ 1	5/ 3600	5/ 3600		
17	Scale	Mean Period	rt.	15	480	60	This value is the period used to calculate the mean smoke background level. The mean period is selectable between the following values in minutes: 15, 60, 120, 240, 480.	DST
		Sensitivity Mode 1	S1.	0.1	10.0	1.0	Use this function as a multiplier of the original alarm thresholds to increase or decrease the sensitivity of the smoke detection when the 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 greater than 1.0, the smoke detection becomes more sensitive. It becomes less sensitive if this function value is set to less 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 are pollutants outside the detection zone causing false alarms, it can be solved by decreasing the sensitivity by using another Aspiris device to detect the pollutant level and connect its relay to the GPI of the Aspiris device in the detection zone.	
		Sensitivity Mode 2	S2.	0.1	10.0	1.0		
		Reference Detector Address	rA.	0	250	0	Set 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 the reference detector address set above.	
		Reference Dilution	rd.	1	100	100	This value 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 build-up of pollution being seen by the reference and the pollution being seen by the detector.	
18	SW Version.	Model					Read only.	USR
		Controller	SC.				Read only.	
		Display	Sd.				Read only.	
		Serial No.	SN.				Read only.	

ITEM	MENU	PARAMETER	LEAD NO.	MIN	MAX	DFT	DESCRIPTION	ACCESS LEVEL
19	Reserved						NA	
20	Optional	Zone Used	OP.	0	1	1		DST

	Module	Display Used	Od.	0	1	0		
		Filter Used	OF.	0	1	0		
		Sensor Used	OS.	0	1	0		
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)	
		Calibration	CA.	NA	NA	NA		
		High	H.	-40	125	58	A fixed temperature heat detector generates an alarm condition if the temperature within the protected area reaches the temperature alarm threshold (ºC) **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 increase per minute, irrespective of the starting temperature. 0: Disable Rate of Rise Temperature Alarm	
		Time Delay	td.	0	60	10	Sets the temperature rate of rise time	
		Fire 2 Logic	OL.	0	3	0	Selects how smoke and humidity signals are used to generate Fire 2 alarm (0 = smoke only; 1 = smoke AND humidity; 2 = smoke OR humidity; 3 = humidity only)	
		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)	
		Calibration	CA.	NA	NA	NA	Not used the humidity sensor does not require calibration	
		High	H.	0	100	80	Sets the humidity alarm threshold in percentrage	
		Rate of Rise	rr.	0	100	20	The set value rate increase per minute will trigger an alarm	
		Time Delay	td.	0	60	10	Sets the humidity alarm delay time	
		Fire 2 Logic	OL.	0	3	0	Selects how smoke and humidity signals are used to generate Fire 2 alarm (0 = smoke only; 1 = smoke AND humidity; 2 = smoke OR humidity; 3 = humidity only)	
		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							

ITEM	MENU	PARAMETER	LEAD NO.	MIN	MAX	DFT	DESCRIPTION	ACCESS LEVEL
24	CO	Enable	EN.	0	2	1	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)	
		Calibration	CA.	OFF	ON	OFF	When set to ON the CO sensor is calibrated	

	High	H.	0	500	30	Sets the CO alarm threshold in parts per million (PPM)	
	Rate of Rise	rr.	0	500	10	The set value Rate increase per minute will trigger an alarm	
	Time Delay	td.	0	60	10	Sets the CO alarm delay time	
	Fire 2 Logic	OL.	0	3	0	Selects how smoke and CO signals are used to generate Fire 2 alarm(0 =smoke only; 1 = smoke AND CO; 2 = smoke OR CO; 3 = CO only)	
	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.	
25 Reserved							

Access level

- DST: Distributor access level, full access authorisation for commissioning purposes.
- ADM: Management access level, limited access authorization for user's management purposes.
- USR: User access level, settings are read only and can't be changed.

17. Commissioning

Before commissioning the Detector, the local standards for 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.

Widely accepted standards for computer rooms/IDC areas are British Standard BS6266 and NFPA 76, which involve early detection at the incipient or pre-flame stage of a fire.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 a response.

For areas with higher levels of background particulate matter, the 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 colored 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 requirements should be considered and specified 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 AspirisNet 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 AMS 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 their appropriate values 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 required.

18. Maintenance

Filter maintenance and replacement

The Aspiris Indigo CSD 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 installed and enabled 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 of changing the filter.

Preventive maintenance

To guarantee the best performance of the Aspiris 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, quarterly, 6 monthly, yearly and two-yearly inspection schedules for the Aspiris aspirating smoke detection systems.
It is recommended that monthly inspection is done by the user and all the others are performed by the trained, qualified and competent fire service contractors.

During inspections, check 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.

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 enabled) to check if all the LEDs and Numerical display on the display illuminate normally.

Check the air flow

a. Use Aspiris front panel display or AspirisTool computer software to check and record the air flow readings.
b. Compare the current reading to the previously recorded values to check for any significant change. Air flow reading during maintenance should be confirmed as ± 20% of the values measured at commissioning.
c. If there is a significant change in the air flow, inspect the sampling pipes for breakages or blockages.

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.

Signalling 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 Aspiris 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 Aspiris 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.)

NOTE: Do not introduce compressed air directly into the Aspiris Detector.

UNCONTROLLED DOCUMENT

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