MANUAL

FIRE DETECTION & ALARM SYSTEM

Waitsia Gas – Stage 2

3 – Gas Engine Generators
1 – Diesel Enclosure Generator
2 – Battery Energy Storage Systems

Rev.1.

Contents

Sigma XT
Extinguishant Control Panel

Conventional Fire Control Panel with Extinguishant Control Unit for Aerosol Release

Operation and Maintenance Manual

Available in 2 Zone, 8 Zone, Single risk or dual risk.

Contents

1. Introduction

The FirePro SIGMA XT-A, conventional fire alarm control panel with Extinguishant Control Unit and Aerosol Agent Controller, is designed to comply with AS7240-2, AS7240-4 Fire Detection and Fire Alarm Systems - Control and Indicating Equipment, and AS ISO 14520.1 2009 Gaseous Fire Extinguishant Systems.

The control equipment is a combined fire alarm control panel and extinguishant system with up to eight detection zones, and up to two extinguishant flooding areas. It has an integral, mains powered battery charger and power supply designed in accordance with the requirements of AS7240-4.

In addition to the requirements of AS7240-2 the control panel has the following facilities:

- *Test condition* to allow the automatic resetting of zones in alarm for testing purposes.
- Delay *of the actioning* of fire alarm devices (sounders) so that an alarm may be verified before evacuation.
- Voltage free relays for fire and local fire which operate upon fire condition.

Mounting of Control Panel

This equipment is designed to be operated from 230V 50Hz mains supplies and is of class 1 construction. As such it must be connected to earth conductor in the fixed wiring of the installation and a readily accessible double pole disconnect device which disconnects live and neutral simultaneously shall be incorporated in the fixed wiring.

Failure to ensure that all conductive accessible parts of this equipment are adequately bonded to earth will render the equipment unsafe.

This control panel is designed for indoor use only and at temperatures between -5^{0}C (+/- 3) and +40^{0}C (+/-2) and with a maximum relative humidity of 95%. Standard panels are rated to IP30 and suitable for mounting indoors.

MOUNTING - The control panel should be mounted on a dry, flat surface, at eye height to the display and in a level position.

Cables should be connected using cable glands fitted to the knockouts. If additional entry points are required, all swarf and debris caused by drilling of additional cable entries must be cleared before power is applied.
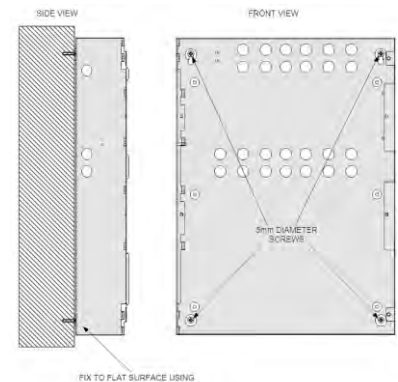
DIMENSIONS: M3 Cabinet: 195 x 300 x 50   Warning Sign: 195 x 300 x 50   LCS: 135 x 186 x 50

Mounting of Warning Signs

Internal Signs	External Signs
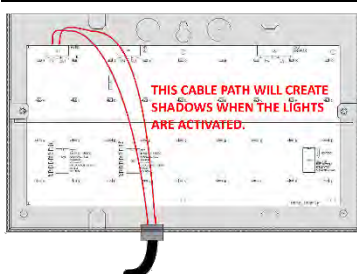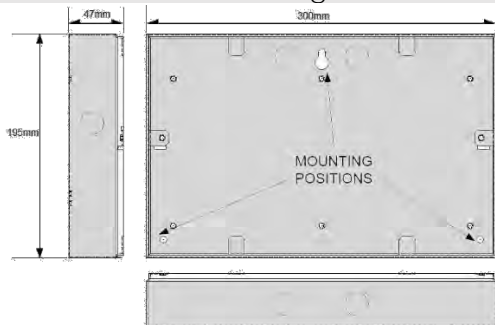
Allow enough length on cable to route cable around the edge of sign

1. Mount Sunshade.
2. Remove cover and Internal circuit board.
3. Mount using suitable fixings ONLY Mount to sunshade surface – if the enclosure is twisted on mounting it will crack over time.
4. Use silicon for securing the lower half of sign.
5. Cable entry must have cable gland fitted. Preferred entry though base of sign with drip loop in cable.
6. Leave enough tail on cable to ensure the cable will not interfere with operation of sign.

2. Access Levels & General Fault Codes

For more information on Access Levels, please see Section 7 - Panel operation – Access levels 1 and 2.

Access Levels 1 and 2

The cabinet door has 3 locks:

The centre lock opens the display window,
  allowing for operation of the controls.

The display window contains a door switch.
Operation of this door switch places the panel in Access Level 2.

The top and bottom locks will open the complete cabinet front allowing for full access to the panel. The alarm module will show when the door is open.

System Mode

Door Switch in Access Level 1

Door Switch in Access Level 2

Access Level 3 – Slide Switches.

ALARM MODULE

Normal – The Slide Switch is to the Left

To Access Level 3 – Slide Switch to the Right

Level 3 – Slide Switch is to the Right

A General Fault will occur on the ALARM MODULE if the Slide Switch is in the Access Level 3 position, and the Door Switch is returned to Access Level 1.

○ General Fault

EXTINGUISHING MODULE - Configuration

Normal – The Slide Switch is to the Right

To Access Level 3 – Slide Switch to the Left

Level 3 – Slide Switch is to the Left

A "CONFIG WP" Fault will occur if the Slide Switch is in the Access Level 3 position, and the Door Switch is returned to Access Level 1.

EXTINGUISHING MODULE - Faults

Any FAULT on the EXTINGUISHANT MODULE will display on the LCD screen on the Extinguishant Module and will also display on the ALARM MODULE as system Mode   and a General Fault

The Panel has 2 major components

- Alarm Module
- Extinguishant Module
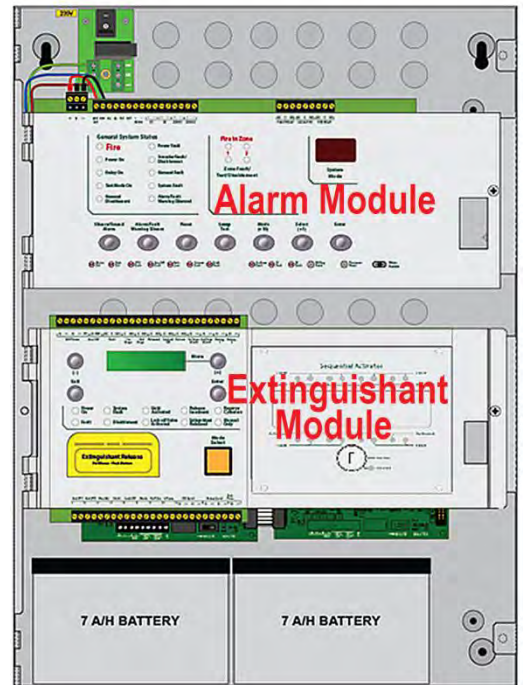
Software revision number

SOFTWARE VERSION LABEL
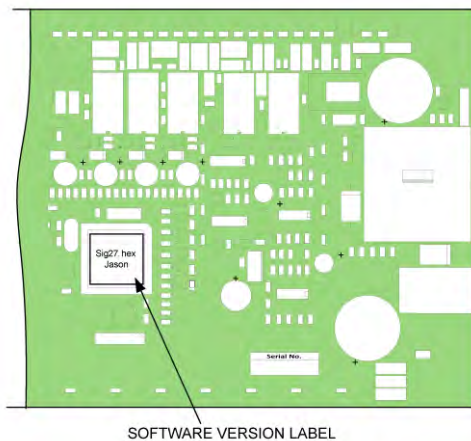
New features may be added to Sigma CP fire control panels from time to time and when this is done the operating software of the unit is updated.

The software revision can be located on the main processor by removing the plate holding the PCB from the enclosure and turning it over.

The software version will have a number such as **"216.hex" and it is this number which will determine** which features the panel has installed and its compatibility with Sigma CP ancillary board, sounders boards, repeaters etc.

The connections for the power cables are to a pluggable terminal block which may be pulled off of the board to remove power from the PCB assembly. Remove this pluggable terminal only with MAINS POWER OFF.

Cabling must comply with the Australian Standards. The resistance of any cable must not exceed 25 ohms.

Terminals are capable of accepting wires of up to 2.5mm^2. Wiring must not go across the front of the circuit board plate or between the plate and the circuit board. If cable entries need to be in positions other than at the knockouts provided, wiring must be fed behind and well away from the surface of the circuit board.

The space at the bottom of the enclosure is largely occupied by the batteries so this must be borne in mind when considering cable entries.
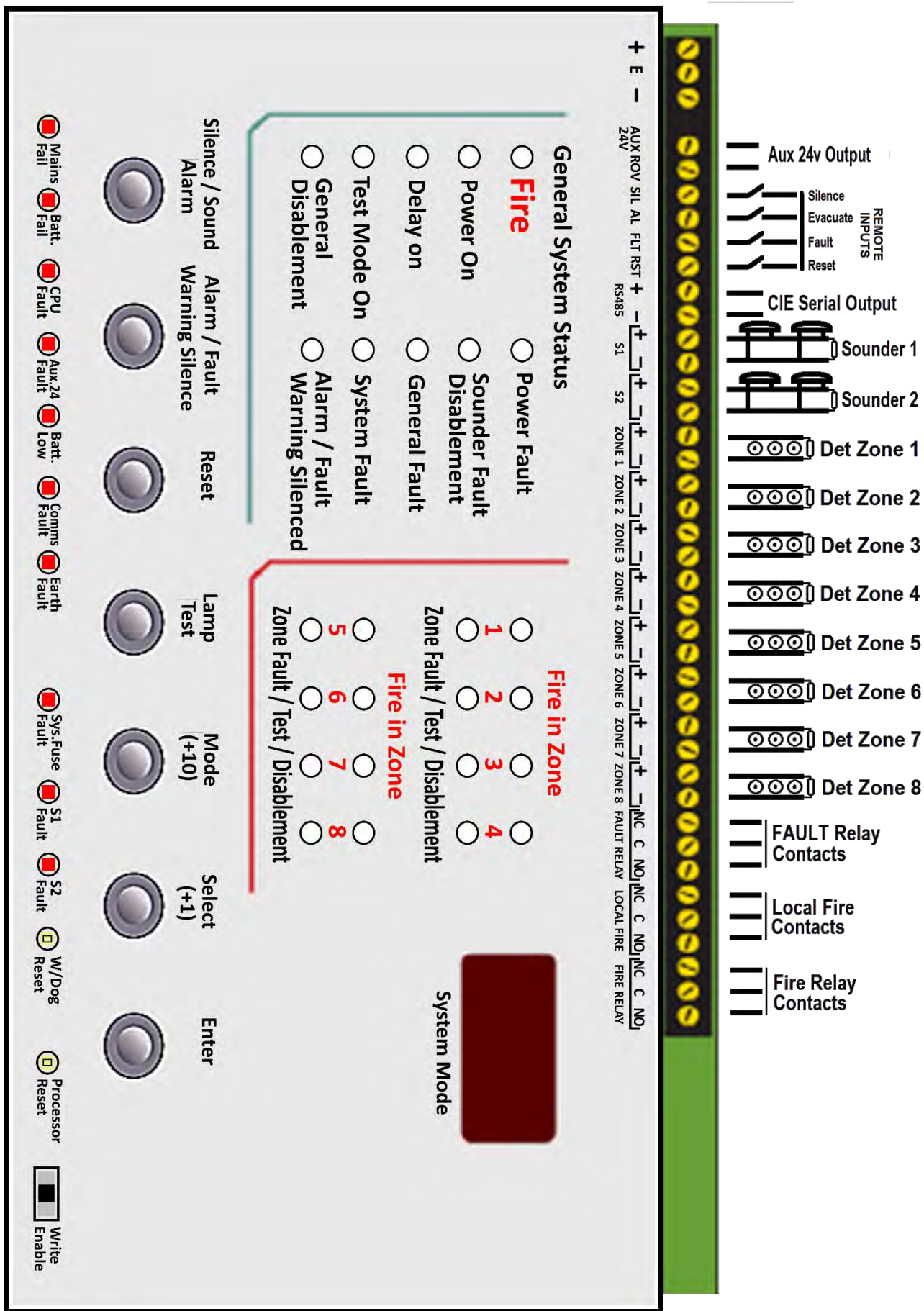
EOL Resistors

EOL Detection Circuits   6K8   EOL Sounder Circuits   10K
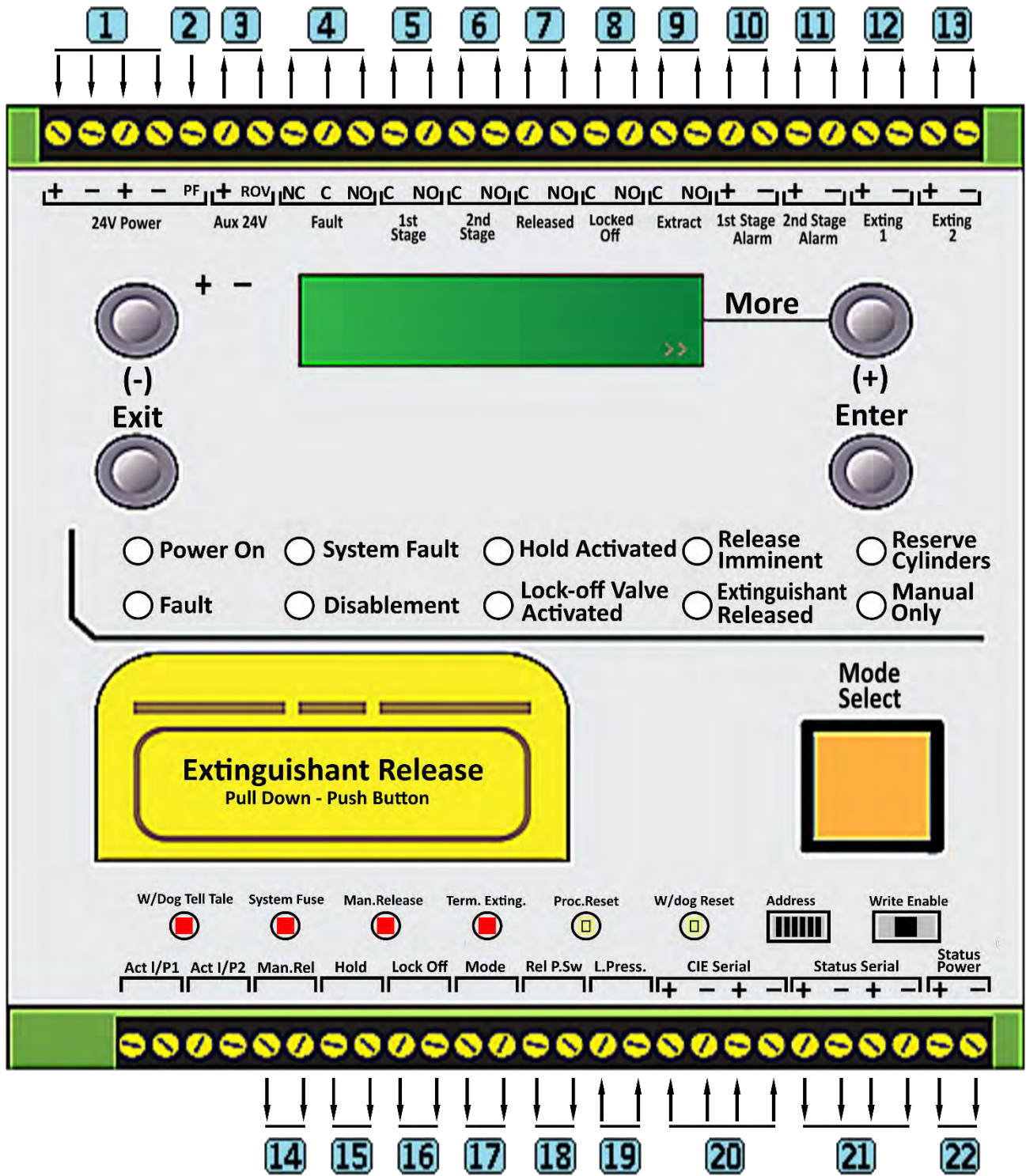
1	24vDC Input from PSU			**12**	Releasing Solenoid	1N4004 Diode
2	PF Input from PSU			**13**	Releasing Solenoid	1N4004 Diode
3	Aux 24vDC Output			**14**	Remote Manual Release Switch	EOL 6K8
4	Fault relay Contact			**15**	Remote Hold Switch	EOL 6K8
5	Stop Air Conditioning			**16**	Remote Abort Switch	EOL 6K8
6	Shutdown Power			**17**	Remote Auto/Manual Select Switch	EOL 6K8
7	Released Relay Contact			**18**	Exting Release Pressure Switch	EOL 6K8
8	Aborted Relay Contact			**19**	Exting Low Pressure Switch	EOL 6K8
9	Extract Fan Power			**20**	Internal Connection from Panel	
10	Ist Stage Sounders	EOL 10K		**21**	Serial data to Status Units	
11	2nd Stage Sounders	EOL 10K		**22**	Power to Status Units	

3.1. Warning Sign and Status Unit Connection

24vDC

DO NOT USE AUX Current Limited to 100mA

Extinguishant Module

(-) Exit   More   (+) Enter

Power On   System Fault   Hold Activated   Release Imminent   Reserve Cylinders
Fault   Disablement   Lock-off Valve Activated   Extinguishant Released   Manual Only

Mode Select

Extinguishant Release
Pull Down - Push Button

Sign 4   **Sign 5**

Sign 6   **Sign 7**

RS485

Sign 1   **Sign 2**   **Sign 3**

24vDC

MAXIMUM of 3 Signs from STATUS POWER - Current Limited to 500mA

Each Sign requires BOTH 24v POWER and RS485 connections as shown. MAXIMUM devices 7.

Individual addresses required for each Sign. The address switch is located on the bottom left hand corner of the status unit. The address is only read when the boards are first powered, so address switches should not be altered on a system that has power applied, as changes will not be recognised. Units with the same address will cause intermittent fault to be displayed

	Sign 1	Sign 2	Sign 3	Sign 4	Sign 5	Sign 6	Sign 7
ADDRESS Vertical Switch							
ADDRESS Horizontal Switch							

FIRE ALARM DO NOT ENTER

Fire / Manual Mode / Manual Release / Disable / Released / 2nd Stage Alarm / Hold / Sys Inop

Fire / Manual Mode / Manual Release / Disable / Released / 2nd Stage Alarm / Hold / Sys Inop

1 / 2 / 3] ADDRESS
Not Used / BUZZ TOP / BUZZ BOTTOM / STEADY TOP / STEADY BOTTOM

FIRE ALARM EVACUATE AREA

Fire / Manual Mode / Manual Release / Disable / Released / 2nd Stage Alarm / Hold / Sys Inop

Fire / Manual Mode / Manual Release / Disable / Released / 2nd Stage Alarm / Hold / Sys Inop

1 / 2 / 3] ADDRESS
Not Used / BUZZ TOP / BUZZ BOTTOM / STEADY TOP / STEADY BOTTOM

SYSTEM INOPERATIVE

Fire / Manual Mode / Manual Release / Disable / Released / 2nd Stage Alarm / Hold / Sys Inop

Fire / Manual Mode / Manual Release / Disable / Released / 2nd Stage Alarm / Hold / Sys Inop

1 / 2 / 3] ADDRESS
Not Used / BUZZ TOP / BUZZ BOTTOM / STEADY TOP / STEADY BOTTOM

3.1.1. Adding - Removing Status units -Electronic Signs – Local Control Stations

PANEL SHOULD BE POWERED DOWN before any changes are made to status units. Status units include Electronic Signs (DNE-EVAC-Sys InOp) and Local Control Stations When the system is first powered on, it will search for connected status units connected to extinguishant module. If status units are connected correctly and detected by the control panel, the LCD will display:

> X FAULTS
> Enter TO VIEW

Open the *Display* Window and Press *Enter* on the module to which the status units are connected. Use the **"+"** button on the module to view the faults. If status units are detected the LCD will display, X = the address of the status unit found.

> STATUS UNIT X
> FAULT

To accept the status units found, slide the WRITE ENABLE switch, on the module to which the status units or ancillary boards are connected to write mode. The LCD will then display, X= the address of the status unit found.

> STATUS UNIT X
> Enter TO ACCEPT

Then press the *Enter* button, the selected status unit or ancillary board will be added to the system and the next unit to be added will be displayed. Press the *Enter* button on the extinguishant module until all of the units have been accepted then slide the *Write Enable* switch to enable mode.

All of the status units found module have now been added and disconnection of any of them will be displayed as a fault on the module and on the detection part of the system. If any status units are disconnected, a Lock Off activated indication will also be displayed at the extinguishant module and all ancillary boards or status units that remain connected. With the *Display Window* Closed, the LCD will display:

> REMOTE BUS
> FAULT

The Status units which are disconnected will have all their indicators flashing.   When additional status units are added, these will be shown on the LCD when the system is powered up.

3.1.2. Alternative Configuration of RS485 Circuit.
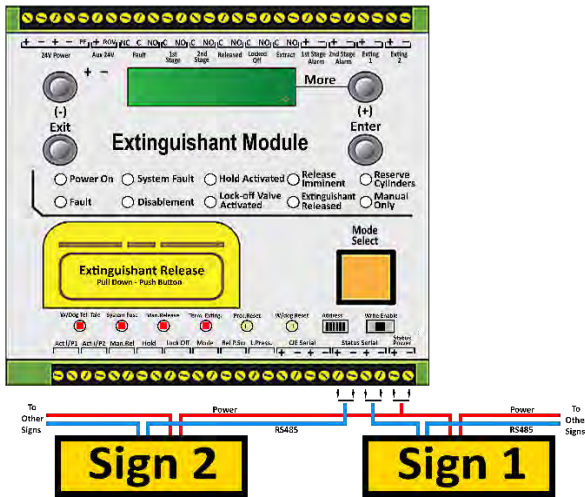
The Panel is normally configured with only1 RS485 cable from the panel. It is possible to have 2 separate cables for the RS485 circuit with the panel effectively in the middle of the circuit rather than at one end.

Where this configuration is required the link LK2 must be removed or positioned over 1 pin only.

PANEL MUST BE POWERED DOWN BEFORE ANY CHANGES TO SIGNS. If process is done with power connected the is a possibility that a short could occur and damage the panel.
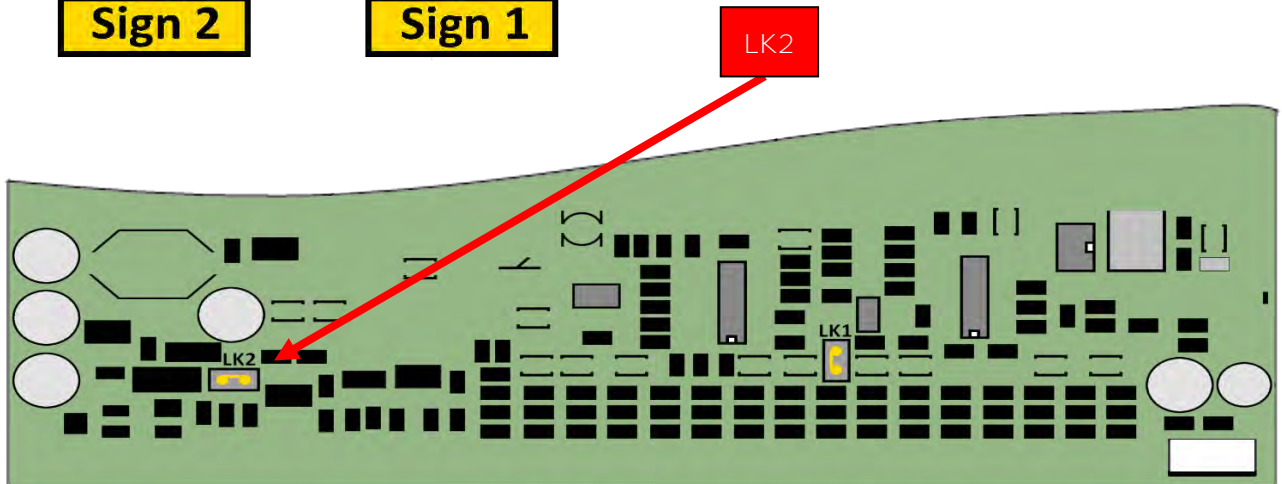
Rear view of Extinguishing Module Circuit Card

3.2. Detection zone wiring

The detection zones provide a nominal 24V DC to power compatible conventional detectors and call points.

The wiring is monitored for open and short circuit fault conditions. Detection zone circuits must be wired as a single, radial circuit with no spurs or T junctions to enable the monitoring circuit to work correctly.
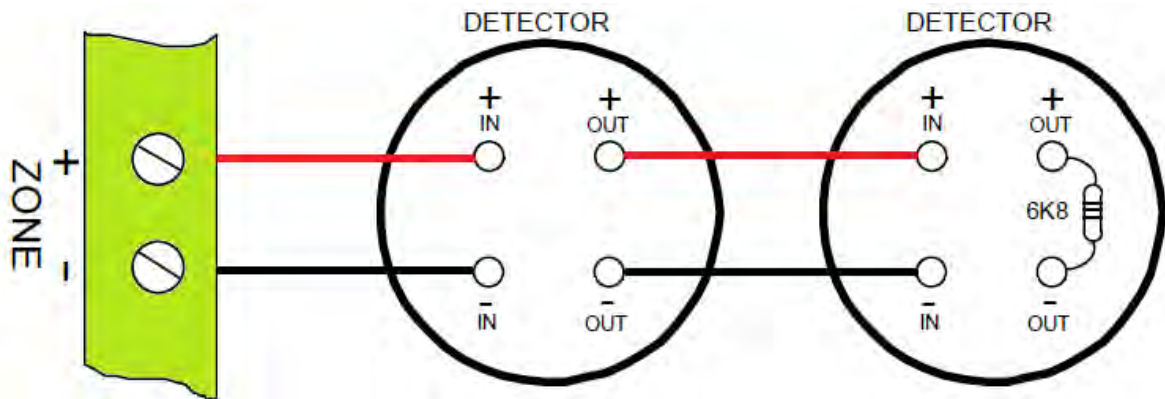
3.3. Sounder circuit wiring

All sounders must be of the polarised type. Sounder circuits are monitored for open and short circuit faults by placing a 10K end of line monitoring resistor across the last device on the circuit.

Sounder circuits must be wired as a single, radial circuit to enable the monitoring circuit to work correctly. A maximum of 1.6 Amps is available for powering sounders with a maximum load of 0.41 Amps on any one circuit.
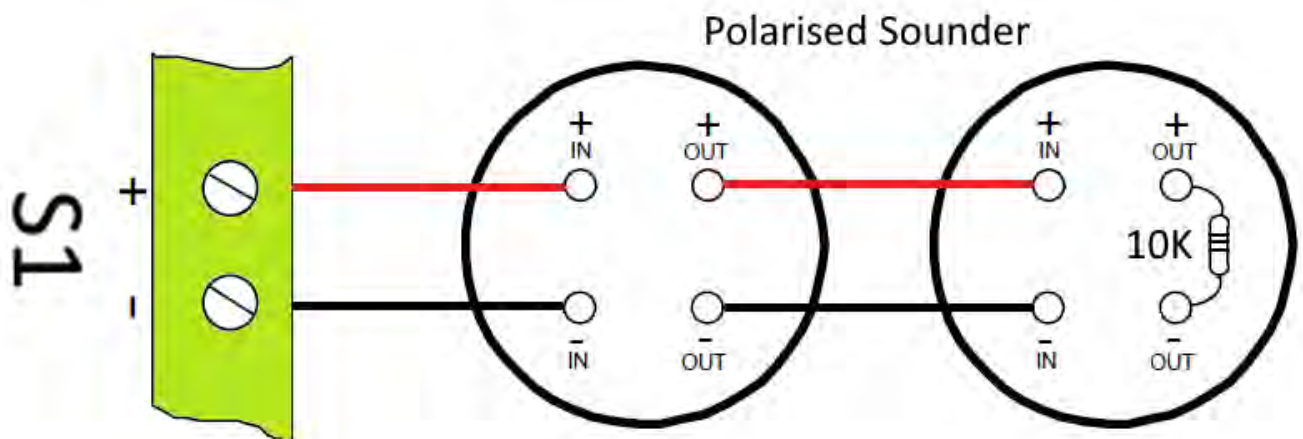
3.4. Thermal Fuse Mounting

The thermal fuse is required by AS-4487 as an indicator that the system has activated. The thermal fuse should be mounted on the most convenient – or closet FirePro unit to the Control Panel. Only one thermal fuse is required in each system. The fuse is mounted in a stainless steel enclosure, and this is rated to IP65. It designed for use at temperatures between -5^{0}C (+/- 3) and +40^{0}C (+/-2) and with a maximum relative humidity of 95%. The fuse is a means of indicating to the FIP that the system has operated. It has no ability to activate the system.

<div align="center">SINGLE USE ONLY – CANNOT BE RESET</div>
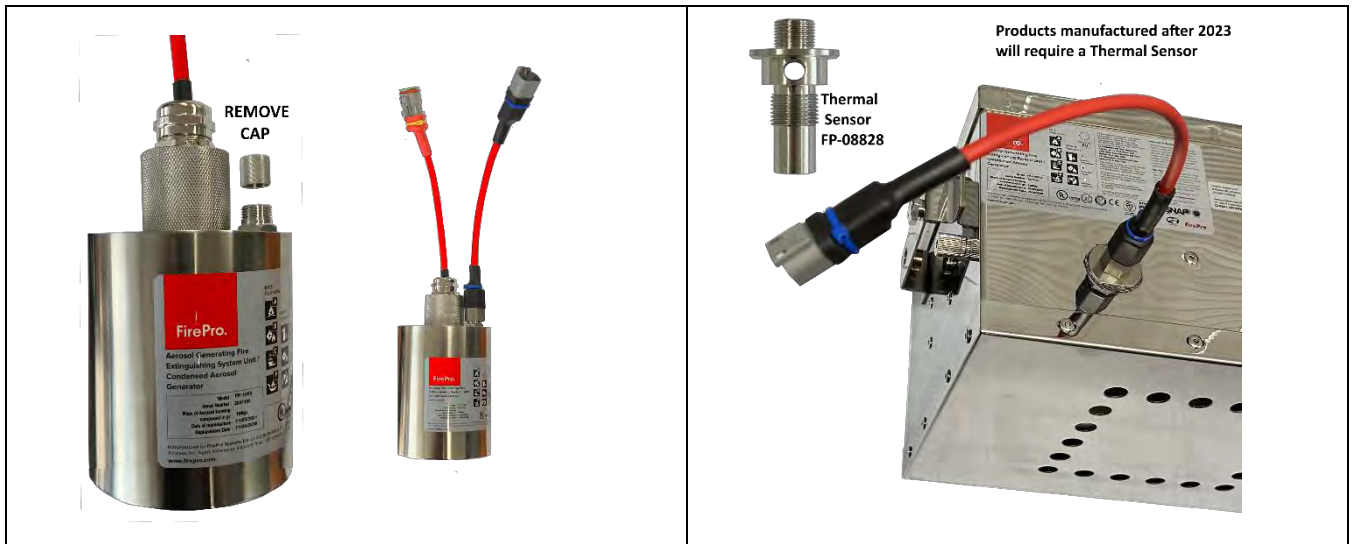
3.5. Thermal Fuse Connection
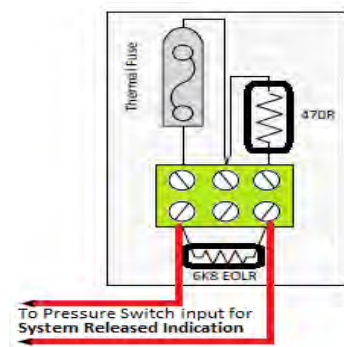
A Thermal Fuse to be connected to the ONE of the FirePro Aerosol Generators has activated. It should be installed in accordance with the instructions included in the relevant FirePro document.

Menu setting in the XT card allows for a normally closed (inverted) input to be used (see manual 6.2.12).

Cables connected using 3 Pin Deutsch Plugs

Connect Thermal Fuse to Rel.P Switch

Thermal Fuse connection when 2 Thermal Fuses installed
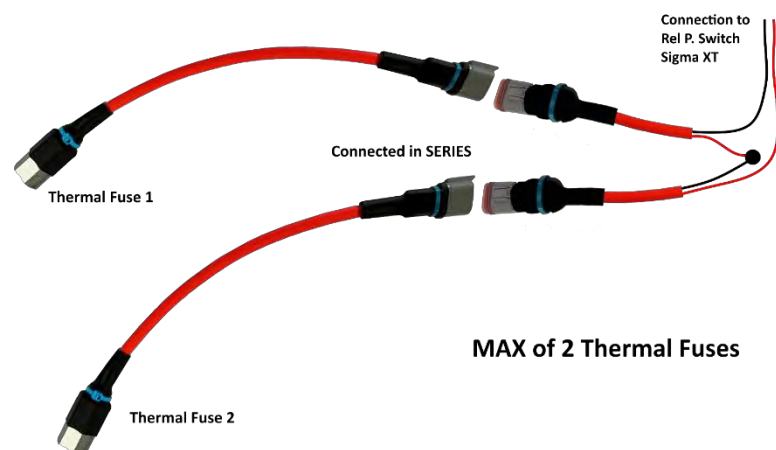
When Using FP-C2 sub FIP with Sigma XT panel. This configuration is used.

MAX of 2 Thermal Fuses

4. Multiway Sequential Activator (FirePro Units)

4.1. Overview

Sequential Activator enables connection of actuator devices. Multiple boards can be connected together to provide control and supervision of up to 40 igniting actuator devices from a single extinguishing control panel circuit.

Where multiple boards are connected, the system comprises one Master board connected to up to 4 Slave boards.

MSA boards provide "Activated" and "Fault" indications and optional display boards can be connected to provide indications. A master "Isolate" control with indication of the isolated status is also available Master display boards.

All outputs can be isolated such that the system can be tested by observing the "Activated" and "Fault" indications with no danger of operating the igniting actuators. Isolation can be performed via the slide switch mounted on the Master MSA board, or a key switch mounted to the panel.

On activation from the control panel, the outputs on each MSA board and subsequent MSA boards operate sequentially such that only one pair of actuator outputs are operated at a time in sequence.
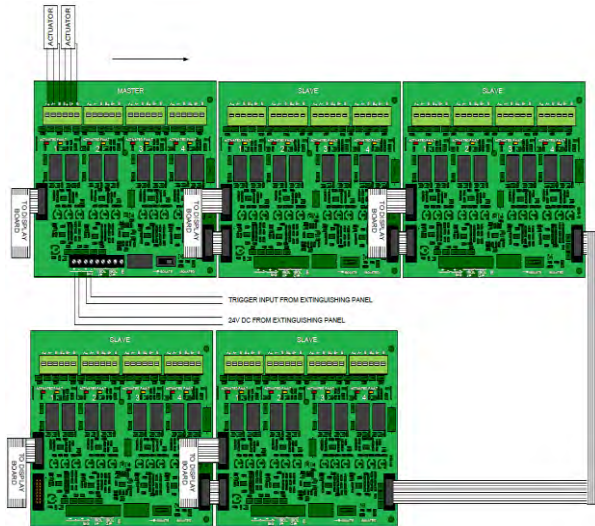
TECHNICAL PARAMETERS	
Ext Input Signal	21-29vDC – Supervised for open and short circuits
Power required	21-29vDC, 100 milliamps
Actuator cable resistance	7 ohms max(A+ to B-)
Actuator resistance	2.6 ohms max per actuator
Actuator output voltage	Follows input voltage – 21-29V
Quiescent current	Avge 10 milliamps per MSA board
Output active time	2.5 to 3 seconds
EOL device	1N4004 diode (Master MSA board, no additional device needed)
Operating temperature	-4C to +40C
Master and Slave size	150mm x 150mm

4.2. Installation

MSA boards must be mounted on metal pillars to a chassis or enclosure that is securely bonded to the earth of the fixed installation in all five mounting positions.

All cabling to the boards should be segregated from any mains cables and wiring to the actuators must be secured to the MSA board with cables ties using the slots provided. Only cables of 2.5mm^2 or smaller can be connected to the terminals.

Cable resistance can reduce the current available to actuators on long runs. Actuator cable resistance should not exceed the maximum value specified in the technical parameters.
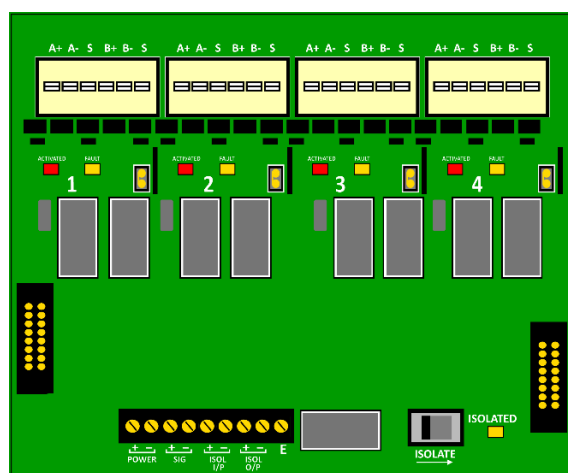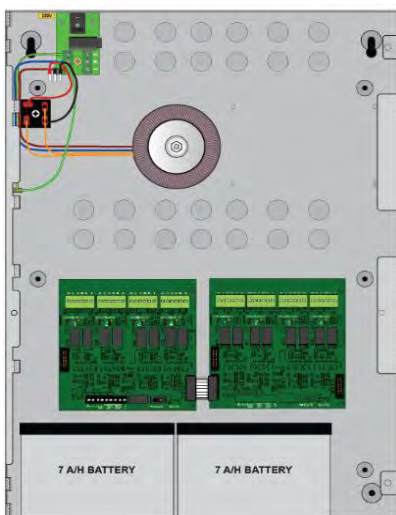
Jumpers are located for each block of terminals. Marked as LK2-5.

These are to be positioned to one PIN only when that block is not being used.

This will indicate that this block is not to be included in the monitored circuit.

(Master shown here)

The signal line from the extinguishing control panel is terminated by a 1N4004 diode which is taken out of circuit when any actuators are disconnected thus signalling a fault condition at the controlling extinguishing panel. A maximum of 4 Slave MSA boards can be connected to a Master MSA board.

4.3. Connection of Aerosol Units to Activation circuit

Quick disconnect terminals are provided in 4 groups of 6 for the connection of actuator devices. To connect the wiring push on the white button on top of the terminal block and insert wire into the aperture making sure that the wire is pushed to the full depth of the aperture. A firm tug on the wire will confirm that it is seated correctly.
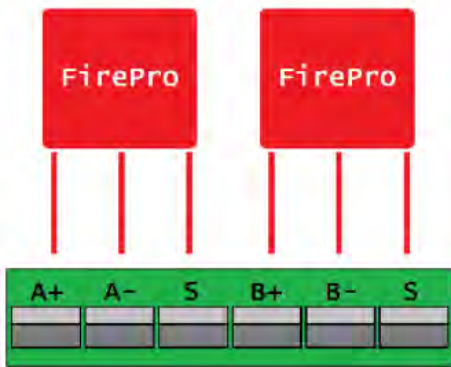
Each FirePro unit is connected directly back to the Sequential Activator as shown. The units are NOT polarity sensitive. ENSURE that earth shield cable is terminated in the terminal marked "S".

Where only one FirePro is required on a circuit a 2R2 3W Wire Wound Surge Resistor must be placed across the other circuit as shown.
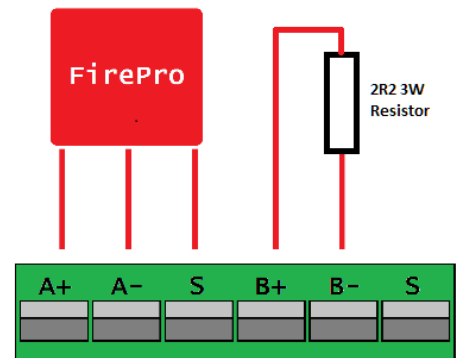
Connections using Splitter Leads

More efficient field wiring may be achieved using Splitter Leads. This allows for a single activation cable to for up to each group of max 4 FirePro units.

The splitter lead is built with a transorb installed which allows for current to be passed for activation under all circumstances.

MAX of 4 FirePro units for each activation Cable. This would require 3 splitter leads.
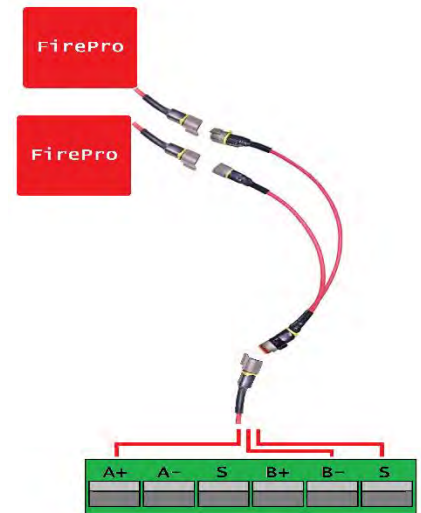
4.4. Connection to FirePro Units

When constructing leads to the FirePro units the supplied Deutsch Plugs must be used to ensure water-proof connections are made throughout the installation.

1. Cut cable to required length and strip outer insulation to approximately 50mm.
2. Strip inner insulation to approx. 6mm and using a Deutsch Crimping tool, fix pins to the exposed ends of the cable, including the earth.
3. Place heat shrink or rubber boot over the end of the cable. Identify correct socket on plug by the numbers/letter on the side of the plug and push through the gasket at the bottom of the plug until a click is heard and the pin is locked in place.
4. Place the locking wedge inside the plug to ensure pins remain secure. (Male plugs the locking wedge is orange. Female plugs the locking wedge is green)
5. Using the heat shrink and rubber boot, seal the back of the plug.
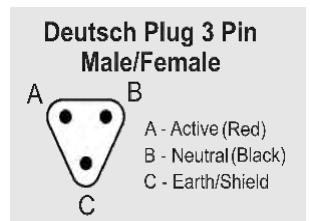
4.5. Input connections

Standard screw terminal connections are provided for connection of the input cables from an extinguishing control panel. These are duplicated to allow the extinguishing circuit to be continued on to other devices if required. A fault will be indicated at the extinguishing control panel if either the trigger input wiring or the 24V power wiring is disconnected from the MSA master board.
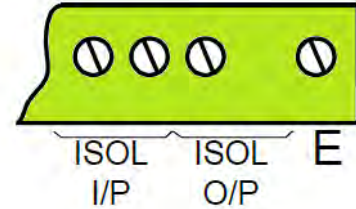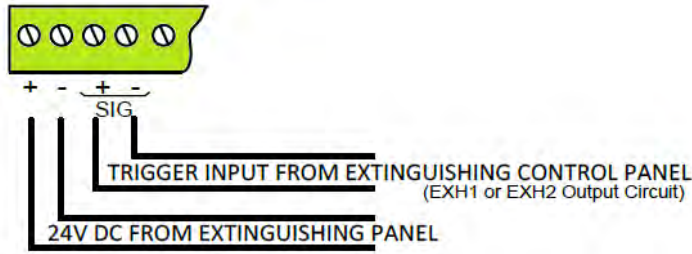
Standard screw terminals are provided for the connection of a remote Isolate switch and indicator. Closing a volt free contact across the ISOL I/P terminals will isolate all outputs. The Isolated condition can be indicated at a remote location via the ISOL O/P volt free terminals.

4.6. Indications

Actuator outputs are supervised for circuit faults and a yellow Fault indicator is provided for each of the 4 dual actuator outputs. This indication is extended to the optional display board.

Activation of each of the 4 dual actuator outputs is indicated by a red Activated indicator which will illuminate as soon as the output operates and remain illuminated until the triggering extinguishing signal is removed. The yellow Fault indicator will illuminate along with the red Activated indicator. This indication is extended to the optional display board. Upon initial power up and after activation Fault LEDs may be illumined for a few seconds while the system stabilises.

A yellow Isolated indicator is provided which will illuminate upon operation of the onboard Isolate slide switch or the front panel mounted Isolate keyswitch or the ISOL input at the terminal block on the Master MSA.

4.7. Jumper links

End of line monitoring. All boards are supplied with jumper links fitted at position LK1 in the bottom right hand corner of the PCB.

This jumper should be removed and placed on one pin of the 2 pin header only on all boards except the last one fitted to the line. If only one board is fitted the jumper can remain in place. This ensures that the ribbon cable connecting multiple boards is supervised for disconnection and a fault is announced at the extinguishing control panel.
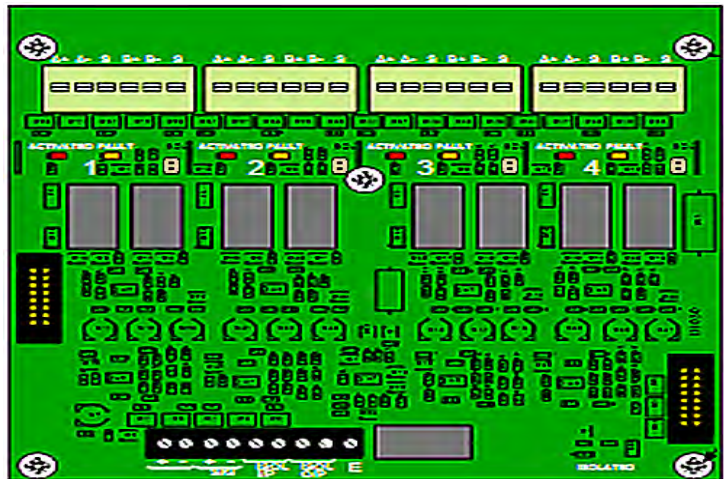
(Slave shown here)

4.8. Fault monitoring links

All boards are supplied with LK2 to LK5 fitted. These links must be fitted to allow the actuator outputs to be supervised. If any of the actuator outputs are not being used the link associated with that actuator output can be removed and placed on one pin of the 2-pin header only.

4.9. Isolate slide switch

As well as the optional front panel key switch or a remote isolate switch connected to the screw terminals, Master MSA boards have a slide switch which can be used to isolate all outputs.

Operation of the Isolate switch is accompanied by a yellow LED and allows testing to be performed by activating the control panels releasing output and observing the indicators on the MSA boards illuminating in sequence.
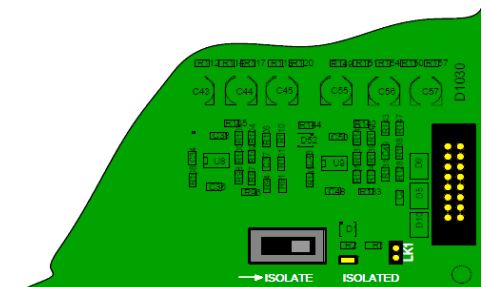
4.10. Display boards

MSA Master and MSA Slave boards have the option for front panel mounted display boards which indicate the Activated and Fault status of the board to which they are connected. The master display board also has an Isolate key switch and Isolated indicator which can be used to isolate all outputs.

The mounting plate for the display board has the facility for a slide in label which can be used to provide a location reference for each of the outputs.
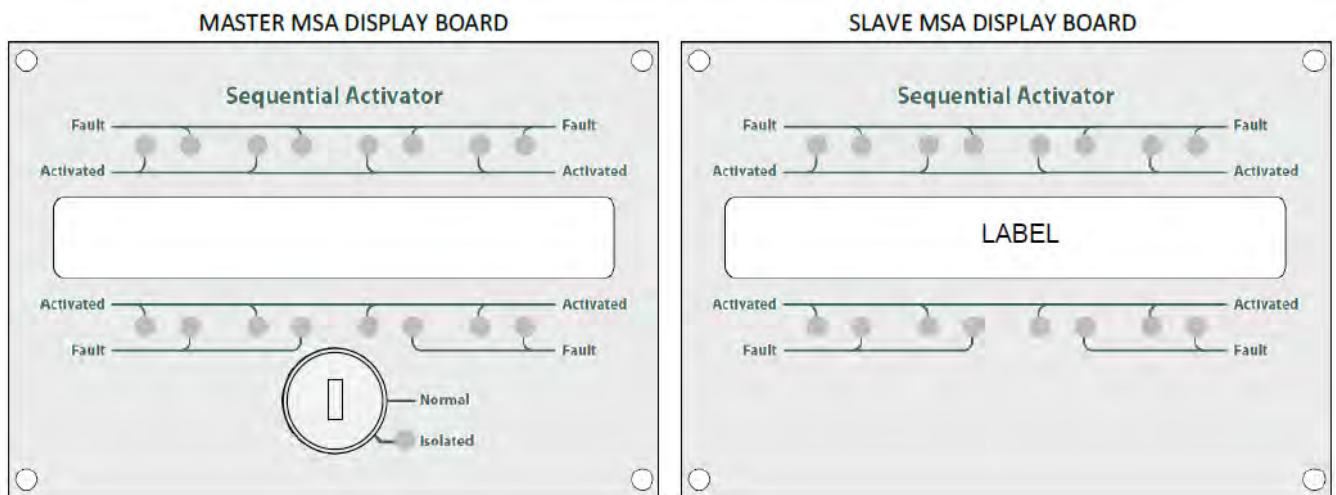
MSA display boards mount to standard MP301TLGT carrier plates and into M2, M3 or M4 enclosures. All display boards have indicators for two MSA boards and connect to the MSA boards via 16 way ribbon cables.

4.11. Setting up extinguishant monitoring circuit

The extinguishant outputs monitor actuator releasing devices. This requires that the outputs be calibrated with the releasing device and the cable to it, fitted as it will be in the working system. The extinguishant monitoring level will be set at approximately 206 but may be between 204 and 208.

Before calibrating the extinguishant outputs ensure that the releasing device is fitted to the cable as shown in section 11.

To change, open the *Display Window* and slide the *Write Enable* switch to the left. Press the *Enter* button on the extinguishant module then press the **"-"** button until the display shows:

If the parameters of the extinguishant output change e.g. by replacing an actuator, then the extinguishant output **monitoring level will need to be "learn**ed**"**. To do this, open the *display window* to put the system into access level 2. The LCD will show:

Enter menu until the LCD displays:

The XXX displayed here is the previous (factory) level to which the monitoring level had been set. Press the *Enter* button. The LCD will now show:

```
EXTING. O/P 1
LEVEL = XXX
```

The XXX shown here is the current monitoring level detected on the extinguishant output. Press *Enter* button accept the monitoring level.

Set the monitoring level for output 2 in the same way if it is being used, otherwise switch the *Write Enable* slide switch to the right (off) position and

```
EXTING. O/P 1
LEVEL = XXX  ?
```

check that an open or short circuit fault on the extinguishant output(s) is detected and shown on the control panel.

NOTE: Value of 255 means that the output is OPEN CIRCUIT. This must be corrected and the circuit re-calibrated.
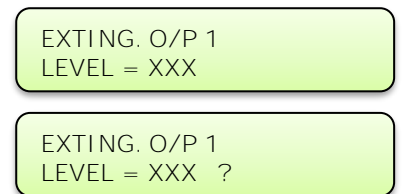
5. Other Connections

5.1. Connection to remote control terminals (not normally used)

Some functions of the control panel can be controlled externally from the panel.   These are on the terminals block as follows:

Remote 0V supply – R0V   Silence Alarm – SIL

Sound Alarm – AL   Fault – FLT

Reset – RST
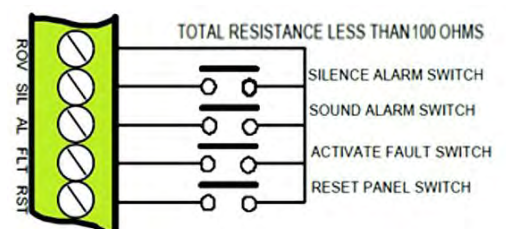
To activate these inputs, the remote 0 Volt (R0V) supply must be connected to the input via a normally open switch or contact and via a resistance of no greater than 100 ohms. All of the remote-control inputs are non-latching.

5.2. Aux 24V DC supply

An auxiliary 24V DC supply is provided to enable local signalling or control of ancillary systems such as door release controllers. The terminals for the Aux 24V supply are labelled Aux 24V and R0V. The R0V terminal is the negative terminal and is the same terminal that should be used to switch the remote-control terminals.

It is possible to make the R0V terminal pulsing so that by connecting it to the AL terminal via a remote volt-free contact, it can be used to pulse the dedicated sounder circuits in response to a signal from another system for example to give an alert. See programming code 24.

The supply is fitted with an electronic self-**resetting fuse to protect the control panel's 24V supply**.

Any standing load on the Aux 24V supply must be considered when calculating battery standby times as standby time will be significantly affected by even modest standing loads. It is recommended that the Aux24V output is not used to power standing loads and not used to supply loads of greater than 500 milliamps.

Where the Aux 24V supply is used to power electromechanical devices such as relays or door retainers it is imperative that a suppression diode is fitted across the coil of the electromechanical device to prevent the generation of high voltage transients back to the control panels power supply.

The Aux 24V DC Supply is not suitable for powering Sigma CP sounder boards or status units.

5.3. Connection to relay contacts

Volt free changeover relay contacts are provided for local control and signalling if required. These contacts are rated for switching signalling circuits only and the maximum ratings listed in Table 1 MUST not be exceeded.

5.3.1. Fault relay (Alarm Module)

The *Fault Relay* is normally energised and will de-energise upon any fault condition on the detection part or the extinguishant part of the control panel including total loss of power.

The marking on the fault relay contacts is in accordance with standards (based on the relay being de-energised) as this relay is normally energised in this panel the NO condition is NORMALLY CLOSED and NC is Normally Open. The relay changes state when a fault condition arises.

5.3.2. Fault relay (Extinguishant Module)

These fault relays are normally energised and will de-energise upon any fault condition on the extinguishant module or total loss of power. These relays provide individual fault outputs.

5.3.3. Local fire relay (Alarm Module)

The *Local Fire Relay* will energise upon activation of a fire condition on any of the zones or pressing of the *Sound Alarm* Button on the front panel. The relay will remain activated until the alarm is silenced or the panel is reset. This relay will not operate upon activation of the remote AL input or when a fire condition is triggered on a zone that is in test mode.

5.3.4. Fire relay (Alarm Module)

The *Fire Relay* will energise upon activation of a fire condition on any of the zones. The relay will remain activated until the control panel is reset. This relay will *NOT* operate upon activation of the remote AL input. Individual zones can be configured not to operate the Fire relay by setting configuration options E1 to E8.

5.3.5. First stage alarm relay (Extinguishant Module)

The *First Stage Alarm Relay* will operate upon activation of a zone that has been configured to contribute to the extinguishant release and will de-activate only when the panel has been reset.

This relay will also operate upon activation of the panel mounted or a remote manual release switch. The stage 1 relay output can be disabled at access level 2 via the menus on the Sigma XT module.

5.3.6. Second stage alarm relay (Extinguishant Module)

The *Second Stage Alarm Relay* will operate when the panel is in the activated condition (i.e. the release countdown timer has started) and will de-activate only when the panel has been reset from the released condition.

The stage 2 relay output can be disabled at access level 2 via the menus on the Sigma XT module.

5.3.7. Released relay (Extinguishant Module)

The *Released Relay* on the extinguishant module will operate when the module is in the released condition.

The Released output can be disabled at access level 2 via the menus on the Sigma XT module.

5.3.8. Aborted relay (Extinguishant Module)

The *Aborted Relay* will operate when the panel is in the aborted condition via an abort switch input.

5.3.9. Extract relay (Extinguishant Module)

This provides a means to vent a room of extinguishant gases but prevents the gases from being vented during a discharge. To switch on *Extract Relay*, pen the *display window* press *Enter*. The LCD will show:

Press **"-"** until the LCD shows:

Press *Enter* to turn ON the *Extract* output and the LCD will show:

```
TURN OFF
EXTRACT OUTPUT
```

```
TURN ON
EXTRACT OUTPUT
```

5.4. Shutdown Isolation Switch

SHUTDOWN ISOLATION

🔴 FIREPRO PANEL 2nd STAGE ALARM ACTIVATED

— NORMAL

— ISOLATE SHUTDOWN

When isolated the FirePro panel will go into fault and operate the System Inoperative Signs.

FirePro
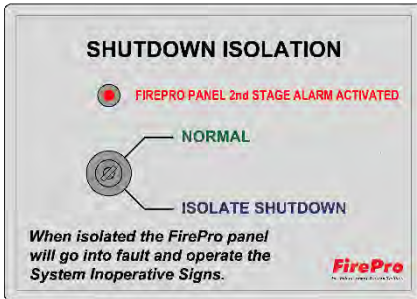
This switch can be installed to "isolate" or disable the shutdown of devices that are connected to the panel. Devices such as Air Conditioners or Sensitive computer devices which are required to be shutdown in a fire, but are not required to be shutdown for Monthly testing purposes. **The switch when "isolated" will activate** the System Inoperative sign and stop the shutdown signal to the connected devices. This is a powered output to drive a relay.

To install this switch connections as follows:

+	**From FirePro Panel**
-	**2nd Stage Alarm**
+	**To Server Shutdown**
-	**Relay 24Vdc 1Amp**
	10K EOL

The *Second Stage Alarm Output MUST* be configured to be steady when using this switch. The factory default for the second stage alarm is pulsing.

To change, open the *Display Window* and slide the *Write Enable* switch to the left. Press the *Enter* button on the extinguishant module then press the **"+"** button until the display shows:

To change to steady second stage alarms, press *Enter* . To save, slide the *Write Enable* switch to the right.

The *Second Stage Alarm Output* will now be steady when the module is activated.

```
PULSED
ACTIV. ALARMS
```

```
STEADY
ACTIV. ALARMS  ?
```

6. Configuring the panel

6.1. Alarm Module

The Alarm Module has 2 or 8 detection zones and has several configuration options which can be set at the time of commissioning to suit the requirements of the installation. The configuration options are only available at access level 3 which is accessed by operating the *Write Enable* switch to the left as shown below. When the panel is at **access level 3, the buzzer will "pip" three times every few seconds as an indication that it is at this access level.**

Configuration options are simple to *Enter* using the codes the table below. When the control panel is at access level 3, the sub-text of the *Mode* and *Select* buttons is used to *Enter* a number using tens (+10) and units (+1).

When the required code number is displayed, pressing the *Enter* button will cause the dot on the units seven segment display to flash. This indicates that a configuration option has been set.

WRITE ENABLE SWITCH

To review which configuration options have been set previously, simply scroll through numbers 1 to 99, A1 to A8, C1 to C8 and E1 to E8 and those with a flashing dot indicate which options have been set.

ZONE 1 I.S. BARRIER
OPTION SET

61 DOT FLASHING

ZONE 1 I.S. BARRIER
OPTION SET

61 NO DOT
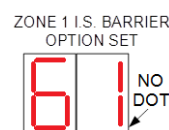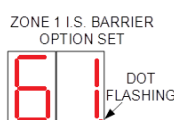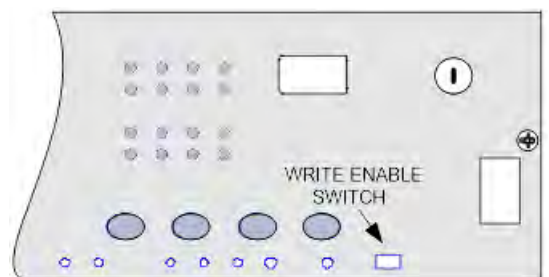
6.2. Extinguishant Module

6.2.1. General Settings

LINKS - The Sigma XT module contains 3 Links.

      LK1   CIE Serial Terminator **–** This terminates the RS485 comms from the control section

LK2   Status Serial Terminator **–** This terminates the RS485 comms to the Status units and Warning Signs

LK3   PF Input Inversion **–** Removing this jumper inverts the PF input so that it must be normally connected to 0V for no fault to be present.

PF INPUT - is used to signal a power failure to the XT Module and id active (power fail mode) when connected to 0V. The function of this input can be inverted by the removal of LK3 on the rear of the board.

6.2.2.   Language Selection

The module is capable of displaying two languages if factory programmed to do so. The first access level 3 option is to select the local language or the default language (English)

6.2.3.   Extinguishant Output mode

The Sigma XT module has two extinguishant outputs. These can be configured to operate together at the same time (common) or be configured as main and reserve outputs. The factory default setting is common.

To change, open the *Display Window* and slide the *Write Enable* switch the left. Press the *Enter* button. The LCD will show:

> EXTING. O/P MODE
> = COMMON

Press the *Enter* button the LCD will show:

Press the Enter button to select main/reserve.

To save, slide the *Write Enable* switch to the right. When the extinguishant module is activated, only extinguishant output 1 will switch on. There will also

> EXTING O/P MODE
> MAIN / RESERVE   ?

be an additional menu item at access level 2 to allow the reserve extinguishant output to be selected.

6.2.4.   Configuring the Activation Mode

It is possible to configure the extinguishant modules to be activated by coincidence (any 2 zones in a range of zones) or a single zone in a range of zones. The activation mode is factory set to coincidence.

> ACTIVATION MODE
> = COINCIDENCE

To change, open the *Display Window* and slide the *Write Enable* switch to the left. Press the *Enter* button on the extinguishant module then press the **"+"** button. The LCD will show:

> ACTIVATION MODE
> = SINGLE

Press the *Enter* button The LCD will show:

6.2.5.   User Output Mode

The clean contact User output can be programmed to be activated either when a First Stage Alarm occurs, or the Hold Input is activated. It is usual for this relay to be used as a First Stage Alarm.

> USER OUTPUT.
> = STAGE 1

To change this, open the *Display Window* and slide the *Write Enable* switch to the left. Press the *Enter* button then press the **"+"** button.

> USER OUTPUT.
> = HOLD

Press the *Enter* button The LCD will show:

The OUTPUT is now set to HOLD. If the *Enter* button is pressed again The LCD will show:

> USER OUTPUT.
> STAGE 1   ?

Press the *Enter* button and the LCD will show. The output is set to Stage 1

> USER OUTPUT.
> STAGE 1

To save the settings, slide the *Write Enable* switch gently to the right. Operation of either a STAGE 1 alarm or the HOLD input, as set above, will result in the activation of the User Output relay.

6.2.6.   Configuring the Activation Zones

The extinguishant modules are factory set to be activated by coincidence activation.

This means that on an 8 zone, 4 extinguishant area panel for instance, zones 1 and 2 will be set to activate the extinguishant module at address 1, zones 3 and 4 will be set to activate the extinguishant module at address 2 and so on. This can be changed if required so that any zones can activate the extinguishant module.

To change, open the *Display Window* and slide the *Write Enable* switch to the left. Press the *Enter* button on the extinguishant module and then the **"+"** button until the display shows, X will be the number of the zone selected to be the first activation zone.

> FIRST ACTIV.
> ZONE = X

> FIRST ACTIV.
> ZONE = X   ?

To change use the **"+"** and **"-"** buttons to select the required zone number. When the required zone is displayed, press the *Enter* button. The display will show the first activation zone.

Press the *Enter* button and then the **"+"** button. The display will then show, X will be the last activation zone.

```
LAST ACTIV.
ZONE = X  ?
```

```
LAST ACTIV.
ZONE = X
```

To change use **the "+"** and **"-"** buttons to select the require zone number. When the required zone is displayed, press the *Enter* button.

6.2.7.   Reset Inhibit Time

This setting can be used to inhibit the reset of the system after it has been activated until there is a signal representing the end of the discharge (a released input) or for an adjustable time period of up to 30 minutes. The factory default for the reset inhibit time is 0.

```
RESET INHIBIT
TIME = 0  ?
```

To change, open the *Display Window* and slide the *Write Enable* switch to the left. Press the *Enter* button on the extinguishant module then press the **"+"** button until the display shows:

```
RESET INHIBIT
TIME = 0
```

Press the *Enter* button and the display shows. To change, press the **"+"** or **"-"** buttons until the time required is displayed and then press *Enter*. To save, slide the *Write Enable* switch to the right.

6.2.8.   Pre-Release Delay Time

This setting allows for a time delay to be set from activation of the extinguishant module to operation of the extinguishant release output. This time may be between 0 and 30 seconds with a maximum of 5 second steps.

The factory default time delay on the Sigma XT extinguishant modules is 30 seconds.

```
PRE-REL DELAY
TIME = 30 SEC
```

To change, open the *Display window* and slide the *Write Enable* switch to the left. Press the *Enter* button on the extinguishant module then press the **"+"** button until the display shows:

```
PRE-REL DELAY
TIME = 30  ?
```

Press the *Enter* button and the display will show. To change, press the **"+"** or **"-"** buttons until the time required is displayed and then press *Enter*.

6.2.9.   Output 2 Delay Time

This setting allows for the **EXT 2 output to be fired a short period after EXT 1. This allows for a 'top-up'** Extinguishant dump if it is needed.

This time may be between 0 and 10 minutes, available in 1 minute steps.

The factory default setting 0 minutes, meaning that the EXT 2 output fires at the same time as the EXT 1 output.

```
OUTPUT 2 DELAY
TIME = 0 MIN
```

The Extinguishant Output Mode must be set to Common.

To change, open the *Display window* and slide the *Write Enable* switch to the left. Press the *Enter* button on the extinguishant module then press the **"+"** button until the display shows:

```
OUTPUT 2 DELAY
TIME = 5 MIN  ?
```

Press the *Enter* button and the display will show. To change, press the **"+"** or **"-"** buttons until the time required is displayed and then press *Enter*.

To save, slide the *Write Enable* switch to the right.

6.2.10.   Extinguishant Release Time

The time that the extinguishant output is active for can be set between 60 and 300 seconds. The factory default time for this is 60 seconds. It is also possible to disable this timer such that the extinguishant outputs remain active until the module is reset. See Release timer menu option section 6.2.15.

```
EXTING. RELEASE
TIME = 60 SEC
```

To change the *Extinguishant Release Time*, open the *Display Window* and slide the *Write Enable* switch to the left. Press the *Enter* button then press the **"+"** button until the display shows:

```
EXTING. RELEASE
TIME = 60  ?
```

Press the *Enter* button and the display will show. To change, press the **"+"** or **"-"** buttons until the time required is shown then press *Enter*.

6.2.11.   Second stage alarm - Pulsing/Continuous

The *Second Stage Alarm Output* can be configured to be steady or pulsing at about 1 second on, 1 second off to suit the desired application. The factory default for the second stage alarm is pulsing.

```
PULSED
ACTIV. ALARMS
```

To change, open the *Display Window* and slide the *Write Enable* switch to the left. Press the *Enter* button on the extinguishant module then press the **"+"** button until the display shows:

```
STEADY
ACTIV. ALARMS  ?
```

To change to steady second stage alarms, press *Enter* . To save, slide the *Write Enable* switch to the right.

MUST be set to STEADY when using Shutdown Isolation Switch

6.2.12. Released Indication

It is possible to select whether the released indication on a module is operated at the same time as the extinguishant release outputs operate or by operation of a thermal fuse connected to the released thermal fuse input.

AS require indication to be via Thermal Fuse which is factory default.

To change, open the *Display Window* and slide the *Write Enable* switch on the module to be configured gently to the right. Press the *Enter* button on the extinguishant module then press the **"+"** button until the display shows:

To change press *Enter*. To save, slide the *Write Enable* switch to the right.

```
RELEASE IND ON
RELEASED INPUT
```

```
RELEASED IND ON
EXTING. REL   ?
```

6.2.13. Delay on manual release

The factory default setting for this is for the manual release to have a delay time the same as the pre-release delay.

To change to have no delay when a manual release is operated, open the *Display Window* and slide the *Write Enable* switch to the left. Press the *Enter* button on the extinguishant module then press the **"+"** button until the display shows:

Press the *Enter* button and the display will show. To change press *Enter*.

To save, slide the *Write Enable* switch to the right. Operation of a manual release will now operate the extinguishant outputs immediately with no delay.

```
DELAY ON
MANUAL RELEASE
```

```
NO DELAY ON
MANUAL RELEASE   ?
```

6.2.14. Pre-Release Delay – Reset/Disable

Once activated, an extinguishant module cannot be reset until after the reset inhibit time has expired and the extinguishant release timer has expired. It is possible to configure the module such that it can be reset during the pre-release delay.

Open the *Display Window* and slide the *Write Enable* switch, on the module to be configured, gently to the left. Press the *Enter* button on the extinguishant module then press the **"+"** button until the display shows:

Press the *Enter* button to change press *Enter*.

To save, slide the *Write Enable* switch to the right. It will now be possible to reset the module during the pre-release delay but not while the extinguishant outputs have operated until after the expiry on the reset inhibit time.

```
PRE-RELEASE DELAY
RESET DISABLED
```

```
PRE-RELEASE DELAY
RESET ENABLED
```

Note: Disabling the Pre-release delay reset may not comply with the requirements of Australian Standards.

6.2.15. Release timer (infinite extinguishant duration)

The release timer can be disabled such that once the extinguishant outputs have operated; they remain operated until the system is reset.

To disable, open the *Display Window* and slide the *Write Enable* switch on the module to be configured gently to the left. Press the *Enter* button then press the **"-"** button until the display shows:

Press the *Enter* button to change to this. To save, slide the *Write Enable* switch to the right. With the release timer disabled, the extinguishant outputs will remain operated until the system is reset.

```
RELEASE TIMER
ENABLED
```

```
RELEASE TIMER
DISABLED   ?
```

6.2.16. ROV Removed on System Reset

This setting should not be changed and should never be set.

6.2.17. Earth Fault Monitoring – Enable/Disable

The factory default setting is for the earth fault monitoring facility to be enabled.

To disable the earth fault monitoring, open the *Display Window* and slide the *Write Enable* switch to the left. Press the *Enter* button on the extinguishant module then press the **"-"** button until the display shows:

Press the *Enter* button to change to this. To save the settings, slide the *Write Enable* switch to the right.

Once disabled, the Aux 24V output will be removed for a few seconds when the reset button is pressed.

```
EARTH FAULT
ENABLED
```

```
EARTH FAULT
DISABLED   ?
```

6.2.18.   Fault Ouput – Enable/Disable

The factory default setting is for the fault output relay to be enabled.

Open the *Display Window* and slide the *Write Enable* switch to the left. Press the *Enter* button then press the **"-"** button until the display shows:

Press the *Enter* button to change. To save, slide the *Write Enable* switch. The fault output relay on the module will now be disabled.

Note: Disabling the fault output does not comply with AS7240-2.

> FAULT OUTPUT
> ENABLED

> FAULT OUTPUT
> DISABLED ?

6.2.19.   Low Pressure Switch – Normal/Invert

To enable low pressure switches to be used which have normally closed rather than normally open contacts, it is possible to invert the input. The default setting is for the low-pressure switch input to use a normally open contact.

To invert the low-pressure switch input, open the *Display Window* and slide the *Write Enable* switch to the left. Press the *Enter* button on the extinguishant module then press the **"-"** button until the display shows:

Press the *Enter* button to change to this.

To save, slide the *Write Enable* switch to the right. The low-pressure switch input will now require a normally closed contact via a 470R trigger resistor and 6K8 end of line resistor for correct supervision.

> LOW PRESS I/P
> MODE = NORMAL

> LOW PRESS. I/P
> MODE = INVERTED ?

6.2.20.   Release Pressure Switch – Normal/Invert

To enable released pressure switches to be used which have normally closed rather than normally open contacts, it is possible to invert the released pressure switch input. The factory default setting is for the pressure switch input to use a normally open contact.

To invert, open the *Display Window* and slide the *Write Enable* switch to the left. Press the *Enter* button on the extinguishant module then press the **"-"** button until the display shows:

Press the *Enter* button to change to this. ==The released pressure switch input needs to be disconnected to bring it into fault before changing from Normal to Inverted or back in order to prevent the input from activating.==

> RELEASED INPUT
> MODE = NORMAL

> RELEASED INPUT
> MODE – INVERTED ?

To save, slide the *Write Enable* switch to the right. The released pressure switch input will now require a normally closed contact via a 470R trigger resistor and 6K8 end of line resistor for correct supervision.

7. Panel operation – Access levels 1 and 2

7.1.   Normal condition

Under normal conditions and with all modules in Manual & Auto mode, control panels will have only the green, *Power On* LED lit on the Sigma XT detection part and on each of the extinguishing modules. With the *display window* closed, the display on the detection part of the panel will be blank and, the LCDs on the extinguishing modules will show:

Any modules that are in Manual Only mode with have an additional, Manual Only yellow LED lit and their display will show:

The Manual Only LED on the module or ECU/LCS which placed the system in manual mode will be flashing.

> AUTO & MANUAL

> MANUAL MODE

The control panel has 3 access levels. Access level 1 is available at all times and allows operation of the *Alarm/Fault Warning Silence* and *Lamp Test* buttons on the detection part of the panel only. Access level 2 is enabled after opening the display window and Access level 3 allows configuration options to be set on both the detection part of the panel and the extinguishant modules following operation of their *respective Write Enable* switches at access level 2 (*the display window is open*).

When the *display window is open* (Access level 2) the display on the detection part of the control panel will show ⊢¦ and the LCDs on the extinguishing modules will show:

> ACCESS LEVEL 2
> MANUAL MODE

7.2. Alarm Module – Access level 2.

7.2.1. Test mode

It is possible to put one or more zones into Test mode. When a zone is in test mode it will self-reset after a few seconds. This enables the system to be tested without having to return to the control panel to reset between each device activation on the zone that is being tested.

To put a zone into test mode, open the *Display Window*.

The 7-segment display t 1 will show

(Test zone 1). To put zone 1 into test mode, press the *Enter* button on the Sigma XT detection part.

The display will now show a flashing dot next to the t 1 and the yellow Test LED will be lit.

To select further zones to put into test mode, press the *Select* button and then the *Enter* button so that the flashing dot appears next to the selected display e.g., t2.

To remove test mode from a zone, press the *Select* button to reveal any zones that have a flashing dot and then press the *Enter* button to take that zone out of test mode. Once all zones have been taken out of test mode, the yellow, *Test* LED will go off.

7.2.2. Disable zones

It is possible to disable one or more zones. When a zone is disabled it will not report fire or fault conditions. This enables the system to be worked on without false fire or fault conditions being announced.

To disable one or more zones, open the *Display Window*. The 7-segment display will show t 1 (test zone 1)

Press the *Mode* button and the display will show d 1. To disable zone 1 press the *Enter* button. The display will show d 1 and the yellow *Disablement* LED will be lit.

To select further zones to disable, press the *Select* button and then the *Enter* button so that the flashing dot appears next to the selected display e.g. d2

To remove disablements, press the *Select* button to reveal any zones that have a flashing dot next to the displayed zone number and then press the *Enter* button. Once all zones have been enabled, the yellow, Disabled LED will go off.

7.2.3. Disable sounder outputs

The sounder outputs on the detection part of the panel can be disabled if required.

To disable the panel sounder outputs, open the *Display Window*.

The 7 segment display will show t 1 (test zone 1). Press the *Mode* button until the display shows db

Press the *Enter* button. The display will now show db the yellow *Disablement* and *Sounder Fault* LEDs will be lit.

To enable the sounder outputs, press the *Mode* button while at Access level 2 (*Display Window open*) and scroll with the mode button until db is displayed. Press the *Enter* button. The display will change to db and the *Sounder Fault* and *Disablement* LEDs will go OFF if there are no other disablements active on the panel.

7.2.4. Activate delays

It is possible to set delays before sounder outputs will operate (see section 6.1). Before these time delays become effective it is necessary to turn on the *Activate Delays* function.

To do this, open the *Display Window*. The 7-segment display will show t 1 (test zone 1)

Press the *Mode* button until the display shows Ad. Press the *Enter* button, the display will now show Ad and the yellow *Alarm Delay* and *Disablement* LEDs will be lit.

To switch off the delay, press the *Mode* button while at Access level 2 (*Display Window* open) and scroll with the *Mode* button until Ad is displayed. Press the *Enter* button. The display will change to Ad and the *Alarm Delay* and *Disablement* LEDs will go off if there are no other disablements active on the panel.

7.3. Extinguishant modules

7.3.1. Extinguishant System Service Isolate

An Extinguishant System Service Isolate keyswitch is provided on each risk and physically disconnects both contacts of firing line to the extinguishant solenoid or detonator. This minimises the chance of an accidental release of the extinguishant during testing or maintenance, thus allowing the system to be fully functionally tested.

Turning the Extinguishant System Service Isolate key switch clockwise will isolate the extinguishant circuit, and a fault is generated and the *Service Isolated* LED is lit.

7.3.2. Extinguishant modules **–** Menu Access

With the *Display Window* open, all extinguishant modules will display:

```
ACCESS LEVEL 2
ENTER FOR MENU
```

7.3.3. Extinguishant release outputs.

Extinguishant release outputs, press the **"+"** button on the module while at access level 2. The display will show:

```
DISABLE
EXTING. RELEASE  ?
```

```
ENABLE
EXTING. RELEASE   ?
```

Press the *Enter* button to select this function. The display will show *Disabled* and the Disabled LED will be lit.

Close the *Display Window* to leave the disablement active.

7.3.4. Manual release

Manual release inputs (front panel mounted and remotely connected), press the **"+"** button on the module while at access level 2 until the module displays:

```
DISABLE
MANUAL RELEASE  ?
```

```
ENABLE
MANUAL RELEASE   ?
```

Press the *Enter* button to select this function. The LCD shows *Disabled* and the Disabled LED will be lit.

Close the *Display Window* to leave the disablement active.

7.3.5. Disable Stage 1 output

To disable the First Stage relay output, press the **"+"** button on the module while at access level 2 until the display shows:

```
DISABLE
STAGE 1 OUTPUT  ?
```

```
ENABLE
STAGE 1 OUTPUT   ?
```

Press the *Enter* button to select this function. The display will show, and the yellow *Disabled* LED will be lit.

Close the *Display Window* to leave the disablement active.

7.3.6. Disable Stage 2 output

To disable the Second Stage relay output, press the **"+"** button on the module while at access level 2 until the display shows:

```
DISABLE
STAGE 2 OUTPUT  ?
```

```
ENABLE
STAGE 2 OUTPUT   ?
```

Press the *Enter* button to select this function. The LCD will show, and the yellow *Disabled* LED will be lit.

Close the *Display Window* to leave the disablement active.

7.3.7. Disable Released output

To disable the Released relay output, press the **"+"** button on the module while at access level 2 until the display shows:

```
DISABLE1
RELEASED OUTPUT  ?
```

```
ENABLE
RELEASED OUTPUT   ?
```

Press the *Enter* button to select this function. The LCD will show, and the yellow *Disabled* LED will be lit.

Close the *Display Window* to leave the disablement active

7.3.8. Extract output

To disable Extract relay output, press the **"+"** button on the module while at access level 2 until the display shows:

```
DISABLE
EXTRACT OUTPUT  ?
```

Press the *Enter* button to select this function. The LCD will show and the yellow *Disabled* LED will be lit.

Close the *Display Window* to leave the disablement active.

```
ENABLE
EXTRACT OUTPUT  ?
```

To turn on the extract relay output, press the **"-"** button on the module while at access level 2 until the display shows:

```
TURN ON
EXTRACT OUTPUT  ?
```

Press *Enter* to turn ON the *Extract* output. The display will show. Pressing *Enter* again will turn OFF the *Extract* output
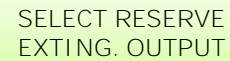
Close the *Display Window* to leave the Extract output active Note: the extract output does not turn off when the module is reset.

```
TURN OFF
EXTRACT OUTPUT  ?
```

7.3.9. Select Reserve Solenoid Output (Configuration Option)

If the extinguishing module is configured for Main/Reserve solenoid operation (See section 15.2.1) then an additional menu option is given to select which output is used.
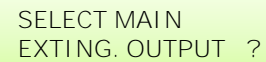
To turn on the Reserve Solenoid output, press the **"+"** button on the module while at access level 2 until the display shows:

> SELECT RESERVE
> EXTING. OUTPUT

Press the *Enter* button to select this function. The display will show:

The yellow *Reserve Cylinders* LED indicator on the module will be lit.

> SELECT MAIN
> EXTING. OUTPUT ?

Note: This menu option is not shown if the panel is configured to Common Solenoid mode.

7.4. Single Zone and Double Zone Fire Conditions

7.4.1. Single zone Fire condition

Upon receipt of a fire condition by activation of a detector or call point, the *Common Fire* indicator on the detection section will light, the fire buzzer will sound and the zonal *Fire* indicator(s) will flash at around 2Hz.

The fire and local fire relays will also operate and signal any systems to which they are connected.

Any sounders connected to the sounder circuits S1 & S2 on the detection section will operate. These sounders may be silenced by operation of the silence alarm button with the enable key switch operated such that the panel is at access level 2.

If the zone that has activated is contributing to the extinguishant release sequence on an extinguishant module and the module is configured for coincidence activation, the *Activated* LED on the module will flash, the *First Stage* relay contact will operate, the *First Stage* sounder output will operate and the display will show:

> PREACTIVATED

Pressing the *Silence Alarm* button on the detection section will turn off the sounder outputs on the detection section and the *First Stage Alarm* outputs on the extinguishant module.

7.4.2. Double zone Fire condition

Upon receipt of a second fire condition that contributes to extinguishant release on modules that are switched to Automatic and Manual mode with their Lock Off inputs not active and the Disable Extinguishant function has not been invoked, the detection section will respond as above and extinguishant modules will respond as listed below:

  a) The second stage alarm output will operate. (Sounder circuit S3)
  b) The Second stage contact will operate.
  c) The Activated indicator will operate
  d) The display will indicate ACTIVATED and show the time remaining until release in seconds.
  e) The extinguishant output will operate after the configured delay time and for the configured duration.
  f) The display will show ACTIVATED DISCHARGING for the duration of the release time.

When detection zones have activated, and the activated condition is reached (i.e. the *Activated* indicator is lit) it shall not be possible to reset the extinguishant section of the panel until the Reset Inhibit timer has elapsed.

7.5. Silence/sound alarms

The *Silence/Sound alarm* button can only be operated at access level 2. (*Enable Control* key switch operated).

To silence the sounders, insert the Enable Control key, turn to the right and press the *Silence/Sound alarm* button. When the sounders have been silenced, the Zone Fire LEDs will change from flashing to a steady state.

Pressing the *Silence/Sound alarm* button whilst the control panel is in this silenced condition will cause the sounders to operate again.

The sounders can be toggled on and off with the *Silence/Sound alarm* button as required.

7.6. Reset

To reset the panel, operate the *Enable Control* key switch, then press the *Reset* button. The extinguishant section will reset only after the Reset Inhibit timer has expired once the activated condition has been established.

7.7. Fault Indicators

7.7.1. Detection Zone fault

Removal of a detector from its base or a fault on any of the zone wiring will cause the *Fault* LED and *Zone Fault* LEDs to flash, indicating the zone in which the fault has occurred.

7.7.2. Sounder fault

A fault on the wiring to the detection section sounder circuits will cause the Fault LED to light and the Sounder Fault LED to flash. A fault on the sounder circuits of extinguishant modules *(alarm devices as required by AS7240-1)* will light the Fault LED on the detection section and on the extinguishant module. The extinguishant module will display:

```
STAGE 1 ALARMS
FAULT
```
or
```
STAGE 2 ALARMS
FAULT
```

7.7.3. Other Faults

POWER - Failure of the mains power or disconnection of the standby battery will cause the *Fault* and *Power Fault* LEDs to light on the detection section indicating an abnormality in the power supply to the control panel. There will be no indication of this condition on the extinguishant modules. Power fault is non-latching and will automatically reset once the fault has been rectified.

SYSTEM FAULT – DETECTION MODULE - The System Fault and general fault LEDs will light if the configuration memory has not been set or has become corrupted. System fault is non-latching and will automatically reset once the configuration has been rectified.

SYSTEM FAULT – EXTINGUISING MODULE - The System Fault and general fault LEDs will light if the configuration memory has not been set or has become corrupted. System fault is non-latching and will automatically reset once the configuration has been rectified.

GENERAL FAULT - The General fault LED will be illuminated under any fault condition. This LED will also light if the *Write Enable* switch has been left in the access level 3 position and the *Display Window is closed (Access Level 1).*

CONFIG WP FAULT – EXTINGUISHING MODULE - The *Write Enable* switch on the Extinguishant Module has been left in the access level 3 position and the *Display Window is closed (Access Level 1).*

7.8. Lamp test

All LED indicators on the panel can be tested at any time by pressing the *Lamp Test* button on the Detection part. Indicators on individual extinguishant modules can be lamp tested by holding down the *Exit* button for more than 2 seconds.

7.9. Lock Off condition

Activation of the Lock Off input or a fault on the monitored wiring of the Lock Off circuit on a module or at a remotely mounted status unit will cause the Lock Off Activated indicator to light on the module and on any status units or ancillary boards connected to it.

If the extinguishant module is in the Activated condition and the pre-release timer is running then the extinguishant release sequence will be halted and the pulsing, Second stage sounders shall change to 1 second on, 2 seconds off.

Release of the Lock Off input will re-start the pre-release timer from maximum.

7.10. Released condition

The released pressure switch input will be connected to a thermal fuse mounted on one the aerosol generator(s) which operates when the extinguishant has been released. This will activate the released indicator on the control panel. If the extinguishant has been released by mechanical means i.e. the control panel is not in the activated condition, operation of the thermal fuse input will establish the Released condition. (See 7.6 & 13.3.12)

7.11. Low pressure switch

This is not used in a FirePro Aerosol Suppression System. The low-pressure switch input will be connected to a pressure switch on the extinguishant cylinder which will operate if the pressure in the cylinder falls below a set point. This will happen after the extinguishant has been released but may happen before release through a leak. The fault LED will light, and the buzzer will sound when this input is operated.

7.12. Manual only mode

The mode of the system can be toggled between Manual Only and Automatic & Manual by operating the Mode Select pushbutton on the modules. The safety cap must be lifted upwards before the pushbutton can be operated.

When a module is in Manual Only mode, the extinguishant cannot be released by the operation of automatic detectors.

The mode can also be changed to manual by the external mode select input or a Mode Select pushbutton on a status unit. Any mode select input that is switched to Manual only mode will override any modules switched to Automatic and Manual mode. All inputs must be switched to Manual and Automatic mode for a module to be in Automatic and Manual mode.

7.13. Manual Release

Extinguishant modules may be activated by Manual release inputs via the manual release control on the front of each module, a remotely mounted Manual release control connected the monitored manual release inputs or by a manual release control mounted on a status unit.

Activation of any of these Manual release controls will immediately activate the extinguishant module and begin the pre-release timer if the module is configured to have a time delay for Manual release inputs.

7.14. Abort input

Each module has the facility for connection of an Abort control. Operation of the Abort input or a fault on the monitored wiring of the Abort circuit during the pre-release delay time or before activation will light the Abort indicator on the module and the extinguishant release timer will be cancelled i.e. the extinguishant will not be released. The module can be immediately reset from this condition.

8. FPC-2 Sub Panel

The FPC-2 Panel enables monitoring detection and automatic extinguishing of a fire in various detection systems on one zone. This Panel is to be used in unmanned spaces only and can report events back to a FIP.

The panel will support up to 4 FirePro® generators. All circuits are monitored. The FPC-2 requires a 24V DC power supply from FIP. There is a single detection Zone and the FPC-2 has automatic activation of extinguishing agent.

Detailed information for connection of FPC-2 is shown in FPC-2 Manual.

9. Internal Controls and Fault Indicators (Troubleshooting)

9.1. Fire Alarm Module

9.1.1. Numerical Display – Detection and Alarm Panel

Under normal operation, this display will indicate the address of the remote board when a fault occurs on that board, or when a board goes missing.

The first section is the board type and the second is its address.

X represents the address 1 to 7

'oX' – Fault on Output board (Relay or AIM module)

'vX' – Fault on Extinguishant module. Refer to Extinguishant module display.

9.1.2. Indicators – Detection and Alarm Panel

MAINS FAIL - Indicates that the 230V AC supply is not present and the system is running on standby batteries. If there is not a power cut, check the panels mains fuse.

BATT FAIL - Indicates that the standby battery has become disconnected or that the charging circuit of the control panel has a high resistance or has failed. Check that both batteries are connected and linked together. Test the battery. Disconnect the battery and ensure that 28 Volts can be measured on battery charger leads.

CPU FAULT - Indicates that the central processor unit has failed to correctly execute code and has been re-started by the system watchdog. The *Watchdog Reset* switch must be pressed to clear the *CPU Fault* condition. If system does not return to normal after the *Watchdog Reset* switch is pressed then the panel is probably damaged and the circuit board needs replacing.

AUX 24V FAULT - The Aux 24V and R0V terminals provide a 500 milliamp, 24V DC power supply for power fire alarm ancillary equipment. This LED indicates that fuse protecting the R0V output has operated and the rating of this output has been exceeded. The fuse is a self-resetting type and the supply will resume when the fault condition is removed.

BATT LOW - Illuminates when the system is running on batteries and the battery voltage is lower than 21V +/- 2% (the minimum battery voltage).

COMMS FAULT - Indicates that communication has been lost with an extinguishant module. Check for comms fault at all extinguishant modules identify the source of the problem.

EARTH FAULT - Indicates that part of the system wiring is connected to earth. Remove all system wiring and re-connect cables one at a time until the earth fault returns.

SYS FUSE FAULT - Indicates that the total power rating of the power supply has been exceeded and that the system fuse has come into operation.   Remove and review all loads and re-connect one at a time until over rated circuit trips fuse to identify troublesome circuit.

S1 FAULT and S2 FAULT - Indicates a short or open circuit on sounder outputs. Remove wiring and refit end of line resistors. Check sounder circuit wiring.

9.1.3. Watchdog reset

If for any reason the microprocessor in the Fire Alarm Module of the control panel fails to carry out its operation correctly it will attempt to restart. **This process is called a "watchdog" and the control panel must record and** indicate these events. If a watchdog event occurs, the fire alarm module will show the Fault and System Fault LEDs on the front panel, the CPU fault LED inside the panel will light and the buzzer will sound. This fault can only be cleared by pressing the Watchdog Reset button on the PCB inside the control panel. The control panel buzzer will continue to sound until the watchdog activation is reset.
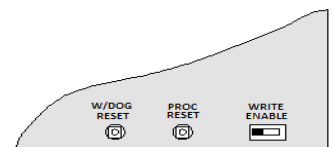
9.1.4. Processor reset

Once started, the microprocessor controlling the fire alarm module of the panel should continue to run continuously without interruption. If the microprocessor fails to run correctly it can be reset by pressing the Processor Reset button on the PCB inside the control panel.

This should not normally be necessary but should be done as a matter of course if the system is behaving abnormally. The system should resume normal operation within a couple of seconds of pressing the processor reset button. It will be necessary to press the Watchdog Reset button a few seconds after pressing the Processor Reset button to clear the Watchdog indication and buzzer.

9.1.5. Write enable switch

To protect the configuration memory of the panel while it is running normally the *Write Enable* switch is provided. The memory *Write Enable* switch must be switched on before any changes can be made to the configuration. The *Write Enable* switch is quite fragile and should be operated with care.

9.2. Extinguishant Module

9.2.1.   Indicators - Extinguishant modules

WATCHDOG - Indicates that the processor has failed to correctly execute code and has been re-started by the watchdog circuit. The watchdog reset switch must be pressed to clear the Watchdog fault condition. If system does not return to normal, then the module is probably damaged and needs the circuit board replacing.

SYSTEM FUSE - Indicates that the modules main fuse has been overloaded and the module is shut down. Remove and review all loads then re-connect one at a time.

MAN. RELEASE - Indicates that either the front panel mounted or a remotely connected Manual release control has been operated. This indication can only be cleared by power cycling the module.

REMOTE BUS FAULT (on display) - Indicates that one or more devices on the remote serial bus is not responding either through a disconnection or failure. Any disconnected status unit will have all indicators and LED displays flashing 88. Any disconnected ancillary board will have its COMMS LED illuminated.

First place to check are the warning signs and LCS modules. Make sure that addresses are different, and that status cabling is correct.

OUTPUT UNIT FAULT (on display) - On panel initialisation after power up or a processor reset indicates that a warning sign or ancillary board has been added or removed from the communications bus. During normal operation indicates that a warning sign or ancillary board has had a processor failure.

STATUS UNIT FAULT (on display) - On panel initialisation after power up or a processor reset indicates that a status unit has been added or removed from the communications bus. During normal operation indicates that a status unit has had a processor failure.

9.2.2. Watchdog reset

If the microprocessor on an extinguishant module fails to carry out its operation correctly it will attempt to restart. If a watchdog event occurs, the Extinguishant module will show *Fault* and *System Fault* LEDs on the front panel,

the detection part of the panel will show a fault and the buzzer will sound and the display on the Extinguishant module will show CPU fault.

This fault can only be cleared by pressing the Watchdog Reset button on the Extinguishant module. The control panel buzzer will continue to sound until the watchdog activation is reset.

9.2.3.   Watchdog reset switch

If for any reason the microprocessor in the control panel fails to carry out its operation correctly it will attempt to restart itself. **This process is called a "watchdog" and the control panel must record and indicate these events.** If a watchdog event occurs, the control panel will show the *Fault* and *System Fault* LEDs on the front panel, the *CPU Fault* LED inside the panel. This fault can only be cleared by pressing the *Watchdog Reset* button on the PCB inside the control panel. The control panel buzzer cannot be silenced and will continue to sound until the watchdog activation is reset.

9.2.4.   Processor reset

If the microprocessor on an Extinguishant module fails to run correctly it can be reset by pressing the Processor Reset button on the PCB inside the control panel. This should not normally be necessary but should be done as a matter of course if the system is behaving abnormally. The system should resume normal operation within a couple of seconds of pressing the processor reset button.

9.2.5.   Processor reset switch

Once started, the microprocessor controlling the panel should continue to run continuously without interruption. If the microprocessor fails to run correctly it can be reset by pressing the *Processor Reset* button on the PCB inside the control panel. This should not normally be necessary but should be done as a matter of course if the system is behaving abnormally. The system should resume normal operation within a couple of seconds of pressing the *Processor Reset* button. Note: A *Watchdog Reset* should always be performed following a *Processor Reset*.

9.2.6.   Terminate extinguishant

Once the extinguishant outputs have been operated they cannot be switched off until after the reset inhibit timer has elapsed. For test purposes a terminate extinguishant button is provided which will terminate operation of the extinguishant outputs and allow the system to be reset.

9.2.7.   Address switch

Extinguishant modules are connected to the serial bus of the Sigma XT detection part of the control panel and each module must be allocated an address between 1 and 7 using the binary coded DIP switch.
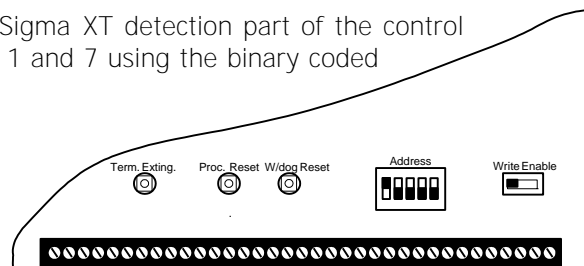

10. Power Supply & Batteries

10.1.   Main Supply

To power up the panel Main Supply must be connected. Following power up the panel will maintain all functions via the internal Backup Batteries. The panel maintains a monitoring function over the condition of the batteries – when batteries become due for replacement a batteries fault is displayed.

The control panel requires a 230V (+10%/-15%), 50/60Hz, AC mains power supply which connects to the fused terminal block labelled **"230V".**

The maximum loading on the power supply must be carefully considered when connecting externally powered equipment.
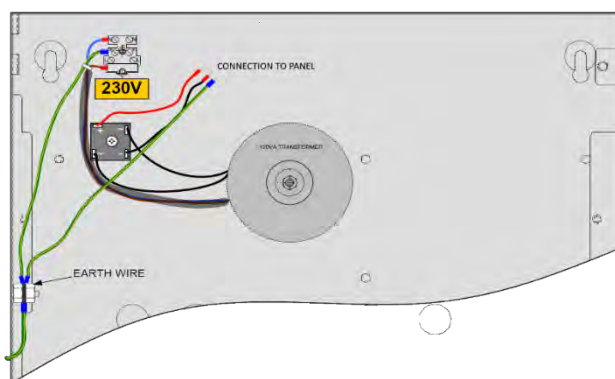
| Fuses | 3A power supply - 20mm, F1.6A L250V | 4A power supply - 20mm T2A L250V. |

Exceeding the maximum power supply rating may cause a fuse or other protective device to operate and render the equipment inoperative until the fuse is replaced or protective devices are reset.

Current in milliamps	SIGMA-2 Zone		SIGMA-8 Zone	
	Quiesant	Alarm	Quiesant	Alarm
Alarm Module	65 mA	100 mA	90 mA	150 mA
Extinguishing Module	54 mA	105 mA	54 mA	105 mA
Sequential Activator – FirePro Systems	10 mA	100 mA	10 mA	100 mA
Warning Signs	20 mA	140 mA	20 mA	140 mA
Local Control Stations	60 mA	70 mA	60 mA	70 mA

The output voltage of the power supply is 18-30V depending on mains and battery condition and the total current rating is either 3A or 4A depending on the model. The incoming mains cable should be routed away from other lower voltage wiring by a distance of at least 50mm. Mains wiring MUST include an earth conductor, which is securely bonded to the building earth and should enter the enclosure as close as possible to the mains terminal block.

10.2. Batteries

Batteries must be Sealed Lead Acid, 12vDC, which are connected in series to provide 24vDC supply. The amp hour rating is calculated based on the total system.

Maximum current drawn from the batteries when the main power source is disconnected is 3 Amps. When the batteries are discharged to a level at which a low battery indication is given, the *Batt Fail* indicator will also be lit.

WRONGLY CONNECTED BATTERIES COULD CAUSE DAMAGE TO THE CONTROL PANEL.

Battery leads are supplied wired to the power supply along with a link to connect the two batteries together. It is most important that the polarity of the batteries is carefully observed when connecting

When the battery voltage drops below 18vDC the panel disconnects from the batteries to ensure that the batteries do not go flat. On resumption of mains power a battery fault will indicate until the battery voltage reaches 21V +/-2% (the minimum battery voltage).
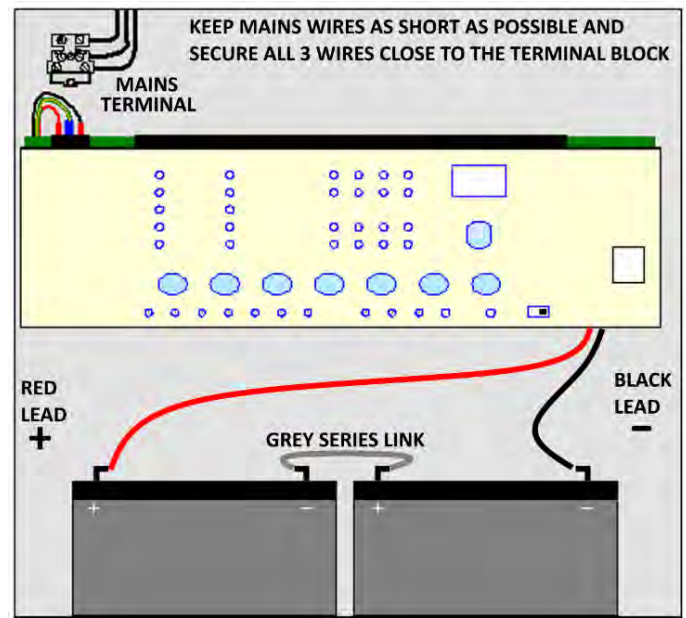
11. Maintenance

Sigma XT control panels do not require any specific maintenance, should the control panel become dirty it can be wiped over with a damp cloth and should then be dried with a dry, lint free cloth. Detergents or solvents should not be used to clean the panel and care must be taken that water does not *Enter* the enclosure.

The control panel contains sealed lead acid batteries to provide standby power in the event of a mains failure. Batteries have a life expectancy of around 2 years

Testing of the extinguishant system should only be carried out by trained personnel and must be done with appropriate isolation measures in place to ensure that accidental discharge of the extinguishant agent is avoided and any malfunction should be reported to the fire alarm maintenance company immediately.

12. Technical specification

Electrical Specifications		
Mains supply	230V AC +10% - 15% (100 Watts maximum)	
Mains supply fuse	1.6Amp (F1.6A L250V)	Replace only with similar type
Power supply rating	3 Amps total including battery charge 28V +/ 2V	
Maximum ripple current	1.5 Volts	
Output voltage	18.5 to 29V DC +/- 2%	
Imax a	400 milliamps	
Imax b	2.3 Amps	
Imin	0.065A	
Battery type (Yuasa NP)	Two 12 Volt sealed lead acid (7Ah maximum)	See Table 2 for capacities
Battery charge voltage	27.6VDC nominal (temperature compensated)	See Table 3
Battery charge current	0.7A maximum	
Battery lead fuse	20mm, 3.15A glass	Replace only with the same type

Battery high impedance warning (Rimax)	1.35 ohms max	
Low battery voltage indication	21V +/- 2%	
Low battery shut off voltage	18.5V +/- 2%	
Max current draw from batteries	3 Amps	With main power disconnected
R0V output	Fused with electronic fuse	
Dedicated sounder outputs	24V Fused at 500mA with electronic fuse	1.6 Amp total load over all circuits
Zonal sounder outputs		
Aux 24V output (detection module)	Fused at 500mA with electronic fuse	200 mA max continuous load 18.5 to 30V DC
Aux 24V output (Extinguishant module)		
First and Second stage Sounder output	18 to 30V DC Fused at 1A with electronic fuse	1.0 Amp total load over all circuits Voltage reversing DC
Fault relay contact rating	30VDC 1A Amp maximum for each	Max ratings not to be exceeded
Fire relay contact rating		
Local fire relay contact rating		
First stage contact rating	5 to 30VDC 1A Amp maximum for each Volt free changeover contact	Max ratings not to be exceeded
Second stage contact rating		
Extract contact rating		
Zone quiescent current	1.6mA maximum	See Table 4 for detector types
Terminal capacity	0.5mm^2 to 2.5mm^2 solid or stranded wire	
Number of detectors per zone	> 20	Dependent on type
Number of sounders per circuit	Dependent on type and current consumption	See Table 6 for sounder types
Detection circuit end of line	6K8 5% ½ Watt resistor	Supplied in terminals
Monitored input end of line	6K8 +/- 5% ½ Watt resistor	
Sounder circuit end of line	10K 5% ¼ Watt resistor	
Extinguishant output end of line	1N4004 Diode	
No. of detection circuits		Dependent on model
No. of sounder outputs	2 (plus one per zone on T models)	
Extinguishant release output	18 to 30V DC. Fused at 1 Amp	1 A maximum load –for 5 minutes 3 A for 20 milliseconds
Extinguishant release delay	Adjustable 0 to 60 seconds (+/- 10%)	5 second steps
Extinguishant release duration	Adjustable 60 to 300 seconds	5 second steps
SIL, AL, FLT, RST inputs	Switched -ve, max resistance 100 Ohms	
Zone normal threshold	8K ohm TO 1K ohm	
Detector alarm threshold	999 ohms to 400 ohms	
Call point alarm threshold	399 ohms to 100 ohms	
Short circuit threshold	99 ohms to 0 ohms	
Head removal condition	15.5 to 17.5 volts	Zener clamp detector base to be used
Cabling	FP200 or equivalent (maximum capacitance 1uF maximum inductance 1 millihenry)	Metal cable glands must be used
Monitored inputs normal threshold (Allowable EOL)	10K ohm to 2K ohm	
Monitored inputs alarm threshold	2K ohms to 150 ohms +/- 5%	
Monitored inputs Short circuit threshold	140 ohms to 0 ohms +/- 5%	
Status unit/Ancillary board connection	Two wire RS485 (EIA-485 specification)	Max 7 units per area- RS485 cable.
Status unit power output	18 - 30V DC, Fused 500mA with electronic fuse	250 mA max load. Max 3 modules
Sequential Activator – FirePro Units	Normal Resistance for FP Unit 2.8R Nominal Short Circuit: 1R ± 25% 20 deg C Nominal Open Circuit: 13R +15% -5% 20 deg C	Min allowable FP resistance across temp to 40 deg C: 3R. When only one FP, a 2.2R 3W resistor in line.

Battery Charge versus Temperature

Temp ^{0}C	Battery Charge	Temp ^{0}C	Battery Charge	Temp ^{0}C	Battery Charge
0	29.2V	10	28.56V	20	27.99V
		30	27.55V	40	27.13V

Compatible Detectors

Model	Type	Manufacturer	Maximum Number per zone
SLV-AS	OPTICAL	HOCHIKI	40
DCD-A	HEAT	HOCHIKI	40
DCD-C	HEAT	HOCHIKI	35
DFJ-60B	HEAT	HOCHIKI	40
DFJ-90D	HEAT	HOCHIKI	35
DFG-60BLKJ	HEAT	HOCHIKI	40
DRD-AS	FLAME	HOCHIKI	25
SPC-AS	BEAM	HOCHIKI	6

13. Commissioning Instructions and Record of Configuration

When power is applied, if all connections are correct, only the green Power On and either the Automatic and Manual or Manual Only indicators should be lit. Use the Table below to record the configuration codes that have been set on the control panel for future reference.

CODE	FUNCTION	COMMENTS	SET
ALARM MODULE			
00	SOUNDER DELAY TIME = 30 SECONDS		
01	SOUNDER DELAY TIME = 1 MINUTE		
02	SOUNDER DELAY TIME = 2 MINUTES		
03	SOUNDER DELAY TIME = 3 MINUTES	Sets the time delay before sounders operate in combination with configuration codes 31 to 48 and access level 2 function AD.	
04	SOUNDER DELAY TIME = 4 MINUTES		
05	SOUNDER DELAY TIME = 5 MINUTES		
06	SOUNDER DELAY TIME = 6 MINUTES		
07	SOUNDER DELAY TIME = 7 MINUTES		
08	SOUNDER DELAY TIME = 8 MINUTES		
09	SOUNDER DELAY TIME = 9 MINUTES		
10	COMMON ALARM MODE	**All sounders operate upon any fire condition**	
11	TWO-STAGE ALARM MODE	Continuous sounders in activated zone, pulsing elsewhere	
12	ZONED ALARM MODE	Only sounders connected to zone in alarm operate	
21*	DISABLE FIRE BUZZER	Buzzer will not operate on fire condition	
22*	DISABLE FAULT OUTPUT	Fault relay will not operate except upon total power failure	
23	DISABLE EARTH FAULT MONITORING		
24	PULSED REMOTE CONTROL OUTPUT	Aux 24V supply pulses 1 sec on/1 sec off	
25	ENABLE Sounders on Detection CIRCUITS	WHERE two wire "T" series detectors and Sirens on same cables)	
26	DISABLE FIRE OUTPUT	Fire relay will not operate upon any alarm	
27	DO NOT CHANGE	Do not Change	
28	INDICATE CALL POINT ACTIVATION - Activation of a call point with a 270R resistance fitted is indicated by a flashing zone indicator and "Pu" on the 7 segment display. Activation of a detector will be indicated by a steady zone indicator and nothing on the 7 segment display		
29	DONT RE-SOUND ALARMS From ANOTHER ZONE - Silenced sounders wont re-sound if further zone activate.		
31	ZONE 1 ALARM from DETECTOR DELAYED		
32	ZONE 2 ALARM from DETECTOR DELAYED		
33	ZONE 3 ALARM from DETECTOR DELAYED	Sounder outputs will be delayed by time set at options 0-9 when selected zone(s) triggered by detector only.	
34	ZONE 4 ALARM from DETECTOR DELAYED		
35	ZONE 5 ALARM from DETECTOR DELAYED		
36	ZONE 6 ALARM from DETECTOR DELAYED	**Note access level 2 function Ad must be set for this to take effect.**	
37	ZONE 7 ALARM from DETECTOR DELAYED		
38	ZONE 8 ALARM from DETECTOR DELAYED		
41	ZONE 1 ALARM from CALL POINT DELAYED		
42	ZONE 2 ALARM from CALL POINT DELAYED		
43	ZONE 3 ALARM from CALL POINT DELAYED	Sounder outputs will be delayed by time set at options 0-9 when selected zone(s) triggered by call point only.	
44	ZONE 4 ALARM from CALL POINT DELAYED		
45	ZONE 5 ALARM from CALL POINT DELAYED		
46	ZONE 6 ALARM from CALL POINT DELAYED	**Note access level 2 function Ad must be set for this to take effect.**	
47	ZONE 7 ALARM from CALL POINT DELAYED		
48	ZONE 8 ALARM from CALL POINT DELAYED		
51	COINCIDENCE ZONE 1		
52	COINCIDENCE ZONE 2		
53	COINCIDENCE ZONE 3		
54	COINCIDENCE ZONE 4	Zone contributes to ancillary board coincidence O/P. Any number of zones can be selected to contribute.	
55	COINCIDENCE ZONE 5		
56	COINCIDENCE ZONE 6		
57	COINCIDENCE ZONE 7		
58	COINCIDENCE ZONE 8		
61	CONFIGURE Z1 FOR I.S BARRIER		
62	CONFIGURE Z2 FOR I.S BARRIER		
63	CONFIGURE Z3 FOR I.S BARRIER	Detection threshold changed for use with IS barrier	
64	CONFIGURE Z4 FOR I.S BARRIER		
65	CONFIGURE Z5 FOR I.S BARRIER		

66	CONFIGURE Z6 FOR I.S BARRIER		
67	CONFIGURE Z7 FOR I.S BARRIER		
68	CONFIGURE Z8 FOR I.S BARRIER		
71*	ZONE 1 SHORT CIRCUIT INDICATES ALARM	Changes the trigger threshold of the zone so that the control panel can be used on older systems that had no short circuit monitoring. **DOES NOT COMPLY WITH AS7240.2** **THIS change required when connecting to FPC2 Module**	
72*	ZONE 2 SHORT CIRCUIT INDICATES ALARM		
73*	ZONE 3 SHORT CIRCUIT INDICATES ALARM		
74*	ZONE 4 SHORT CIRCUIT INDICATES ALARM		
75*	ZONE 5 SHORT CIRCUIT INDICATES ALARM		
76*	ZONE 6 SHORT CIRCUIT INDICATES ALARM		
77*	ZONE 7 SHORT CIRCUIT INDICATES ALARM		
78*	ZONE 8 SHORT CIRCUIT INDICATES ALARM		
81*	ZONE 1 NON-LATCHING	Sets the zone to self-resetting so can be used to receive signals from other systems and will reset when input is removed. Note: Can take up to 20 secs for zone to resetIf when sounders are operating. **DOES NOT COMPLY WITH AS7240.2**	
82*	ZONE 2 NON-LATCHING		
83*	ZONE 3 NON-LATCHING		
84*	ZONE 4 NON-LATCHING		
85*	ZONE 5 NON-LATCHING		
86*	ZONE 6 NON-LATCHING		
87*	ZONE 7 NON-LATCHING		
88*	ZONE 8 NON-LATCHING		
91	ZONE 1 DOES NOT SOUND ALARMS	Prevents the zone from operating the two common sounder outputs.	
92	ZONE 2 DOES NOT SOUND ALARMS		
93	ZONE 3 DOES NOT SOUND ALARMS		
94	ZONE 4 DOES NOT SOUND ALARMS		
95	ZONE 5 DOES NOT SOUND ALARMS		
96	ZONE 6 DOES NOT SOUND ALARMS		
97	ZONE 7 DOES NOT SOUND ALARMS		
98	ZONE 8 DOES NOT SOUND ALARMS		
A1*	ZONE 1 ANY ALARM DELAYED	Zone needs to be triggered for 30 secs continuously before an alarm is generated. **DOES NOT COMPLY WITH AS7240.2**	
A2*	ZONE 2 ANY ALARM DELAYED		
A3*	ZONE 3 ANY ALARM DELAYED		
A4*	ZONE 4 ANY ALARM DELAYED		
A5*	ZONE 5 ANY ALARM DELAYED		
A6*	ZONE 6 ANY ALARM DELAYED		
A7*	ZONE 7 ANY ALARM DELAYED		
A8*	ZONE 8 ANY ALARM DELAYED		
C1	ZONE 1 SOUNDERS INHIBITED	**Not Used** Enables individual zones to be configured not to operate zonal sounders. On 2 wire "T" series panels this enables individual zones to be configured for use with conventional (non-savwire) detector bases.	
C2	ZONE 2 SOUNDERS INHIBITED		
C3	ZONE 3 SOUNDERS INHIBITED		
C4	ZONE 4 SOUNDERS INHIBITED		
C5	ZONE 5 SOUNDERS INHIBITED		
C6	ZONE 6 SOUNDERS INHIBITED		
C7	ZONE 7 SOUNDERS INHIBITED		
C8	ZONE 8 SOUNDERS INHIBITED		
E1*	ZONE 1 WILL NOT OPERATE FIRE RELAY	Enables individual zones to be selected to not operate the fire relay. This is sometimes combined with the non-latching function to prevent ring around on interconnected panels **DOES NOT COMPLY WITH AS7240.2**	
E2*	ZONE 2 WILL NOT OPERATE FIRE RELAY		
E3*	ZONE 3 WILL NOT OPERATE FIRE RELAY		
E4*	ZONE 4 WILL NOT OPERATE FIRE RELAY		
E5*	ZONE 5 WILL NOT OPERATE FIRE RELAY		
E6*	ZONE 6 WILL NOT OPERATE FIRE RELAY		
E7*	ZONE 7 WILL NOT OPERATE FIRE RELAY		
E8*	ZONE 8 WILL NOT OPERATE FIRE RELAY		

Extinguishant Module

CONFIGURATION OPTION	Exting. Module 1	Exting. Module 2
PRE-REL.DELAY TIME =		
EXTING. RELEASE TIME =		
DELAY ON MANUAL RELEASE ?		
EXTING. O/P 1 LEVEL =		
EXTING. O/P 2 LEVEL =		

Sigma XT
Ancillary Board (K588)

Operation and Maintenance Manual
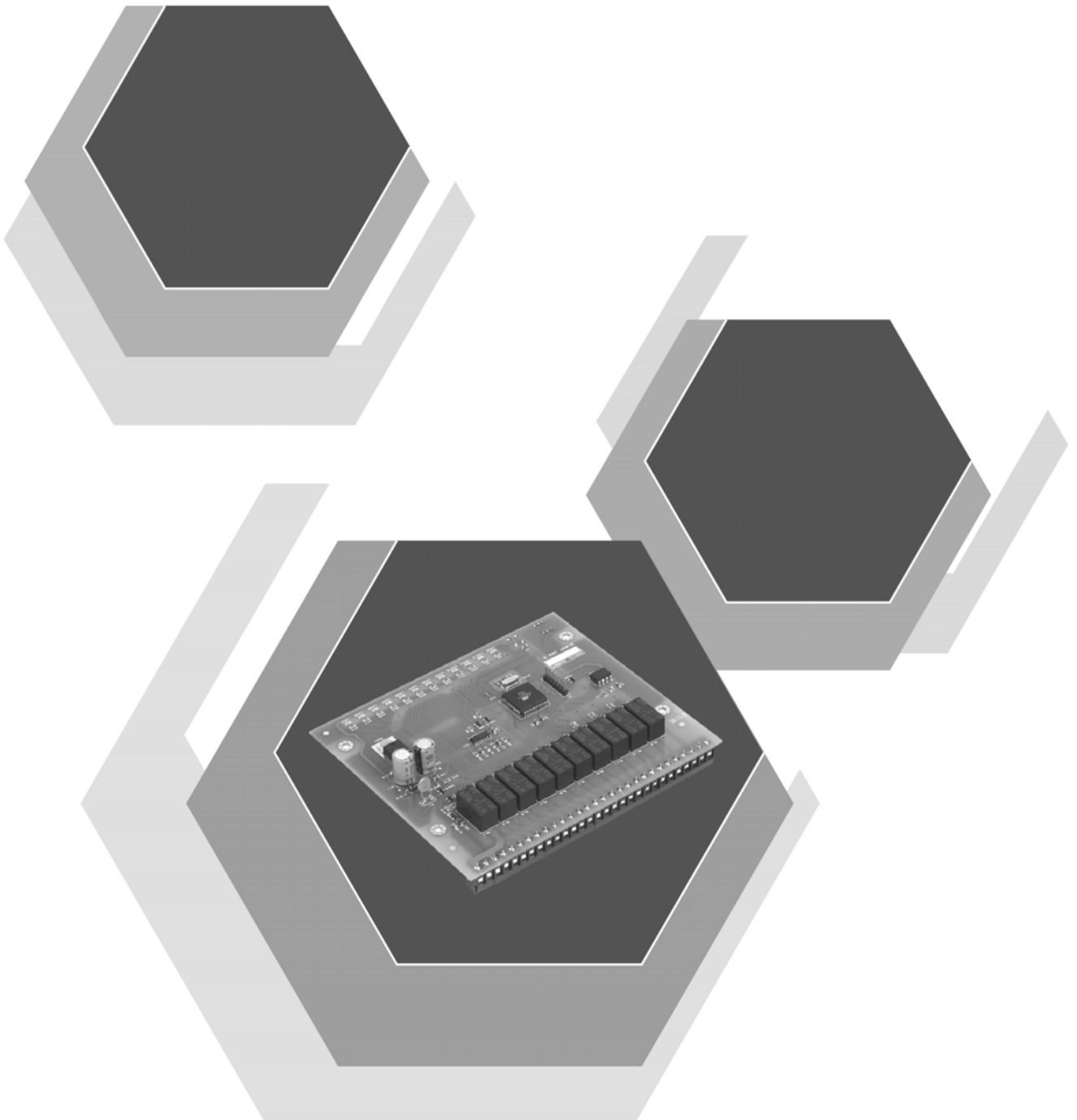
Index

Section	Page

1. Introduction

The Sigma XT ancillary board provides a means for additional outputs within the panel or to extend system status volt free contacts to locations remote from the control panel via a 2 core data bus.

The Sigma XT ancillary board is intended only for additional signalling and control purposes.

The board will typically find applications in plant control and interface to other systems

The Ancillary board is compatible with all Sigma XT control panels.

Up to 7 ancillary boards can be connected to a control panel and each is allocated an address from 1 to 7 using a binary coded DIL switch.

The total length of the data cable from the main panel to the last ancillary board must not exceed 1200 metres.

The ancillary board requires a 24V DC power supply (21V to 30V) which may be derived from the Sigma XT control panel or another 24V DC source.

2. Safety and mounting

Suppliers of articles for use at work are required under section 6 of the Health and Safety at Work act 1974 to ensure as reasonably as is practical that the article will be safe and without risk to health when properly used.

An article is not regarded as properly used if it is used 'without regard to any relevant information or advice' relating to its use made available by the supplier.

This product should be installed, commissioned and maintained by trained service personnel in accordance with the following:

(i)   IEE regulations for electrical equipment in buildings
(ii)   Codes of practice
(iii)   Statutory requirements
(iv)   Any instructions specifically advised by the manufacturer

According to the provisions of the Act, you are therefore requested to take such steps as are necessary to ensure that you make any appropriate information about this product available to anyone concerned with its use.

This Ancillary board is designed for indoor use only and at temperatures between -5^0C and $+40^0$C and with a maximum relative humidity of 95%.

Operation outside of these limits may render the equipment unreliable and/or unsafe.

Mounting

If not fitted inside a Sigma XT panel, the board should be mounted in a suitable enclosure such that it is protected from ingress of water, dust or foreign bodies.

It should be positioned in an accessible place as agreed with the end user.

Suitable fixings should be used at all fixing points such that the board and enclosure are securely mounted and not liable to move once fixed.

The enclosure should not be mounted near sources of excessive heat.

Cables should be connected using suitable, metal, shielded cable glands. All swarf and debris caused by drilling of additional cable entries must be cleared before power is applied.

Mount board at 20mm or greater
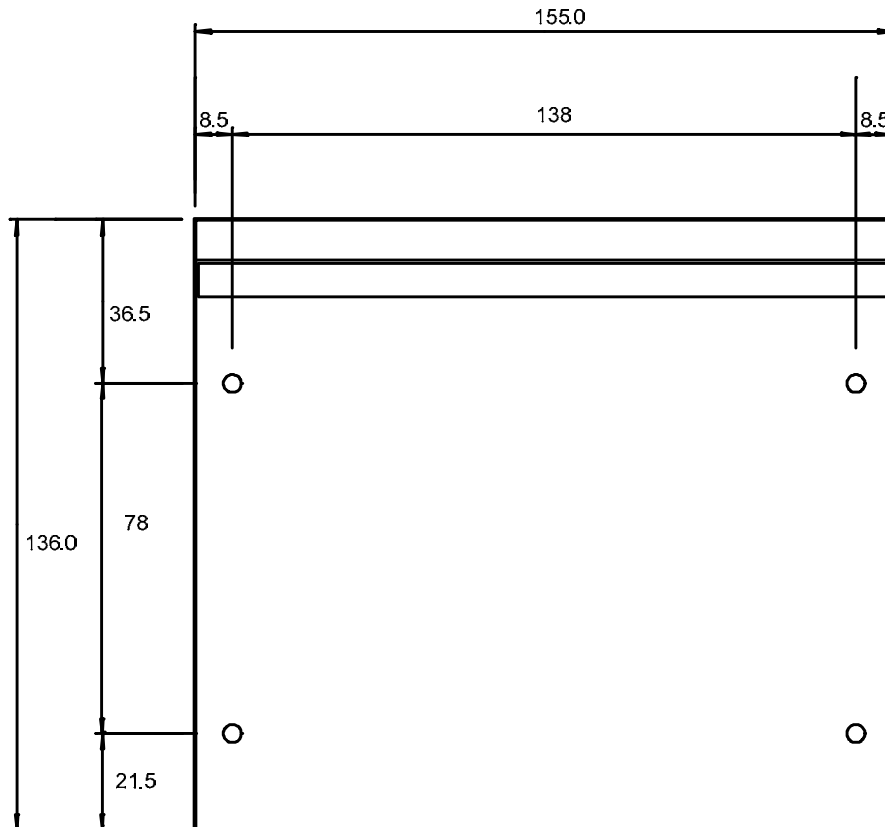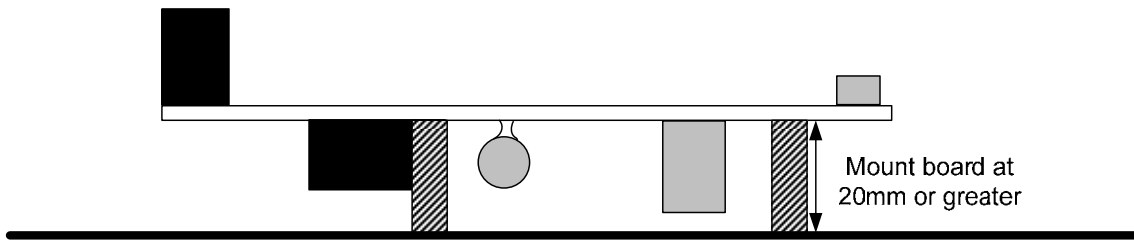
3. Technical specification

Table 1 - Electrical specifications

Power supply	21 to 30 V DC	*Nominal 24V DC*
Maximum ripple voltage	200 millivolts	
Maximum current draw	0.175 Amps	*In full alarm*
Mains failed current consumption	25 milliamps	*In standby mode*
Relay contact rating	30VDC 1A Amp maximum for each	*Maximum ratings not to be exceeded*
Terminal capacity	$0.5mm^2$ to $2.5mm^2$ solid or stranded wire	
Cabling - power	FP200 or equivalent	*Metal cable glands should be used*
Cabling - communication	RS485 data cable or FP200	*Maximum total cable distance 1200 metres. Metal cable glands should be used*
Size	155 X 135 X 30	*Millimetres*
Fixing	Four 4mm holes	*One in each corner of the board*

4. Connecting to the circuit board

All connections for field wiring are to a row of terminals along the top of the circuit board.

Shielded fire alarm cable such as FP200 and metal cable glands should be used for all connections to the board.

The resistance of any core of any cable must not exceed 25 ohms. The shields of the cables should be bonded securely to the enclosure via metal glands.

Wiring should enter the enclosure and be formed tidily to the appropriate terminals.

Terminals are capable of accepting wires of up to 2.5mm^2.

Wiring must not go across the front of the circuit board. If cable entries need to be in positions other than at the knockouts provided in the enclosure, wiring must be fed well away from the surface of the circuit board.

Figure 1- Wiring to the circuit board
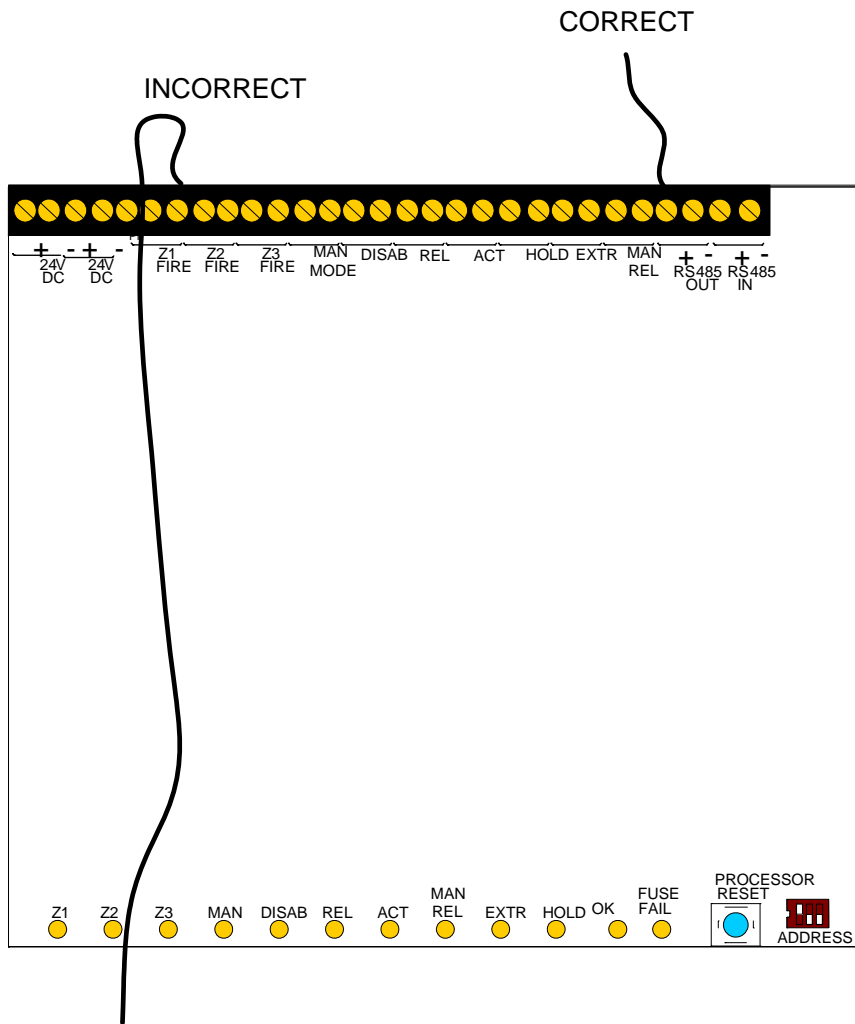
5. Connection to relay contacts

Volt free relay contacts are provided.
These contacts are rated for switching signalling circuits only and the maximum ratings listed in table 1 on page 4 should not be exceeded under any circumstances.
If voltages or currents exceeding those in table 1 on page 5 need to be switched, then a suitable relay or contactor device should be interposed between the ancillary board relay contacts and the system to be controlled.

Z1 to Z3 Fire relays

Zonal fire relays are labelled Z1 FIRE to Z3 FIRE and will operate in conjunction with the activation of zones 1 to 3 on the control panel to which the ancillary board is connected. Zonal fire relays will remain activated until the control panel is reset.

MAN MODE relay

The MAN MODE relay operates when the extinguishant system is switched to manual only mode and switches off when the system is switched to Automatic and manual mode.

DISAB relay
The DISAB relay operates when the extinguishant system is disabled via access level 2 option [dE].

REL relays
The REL relay operates when the released condition has been established at the control panel.

ACT relay
The ACT relay operates when the activated condition (extinguishant release countdown) has been established at the control panel.

HOLD relay
The HOLD relay operates when the system is in the Hold condition.

EXTR relay
The EXTR relay operates when the control panel is operating the extract fan output.

MAN REL relay
The MAN REL relay operates when a manual release input to the system has been operated.

6. 24V Input

The ancillary board requires a nominal 24V DC power supply to operate. This can be taken from the Auxiliary 24V output or status unit power output of the panel to which the ancillary board is connected. Another 24V DC source may be used if this is more convenient.
When using the Sigma XT status unit 24V or Auxiliary 24V outputs, the maximum current of the ancillary boards and status units connected must be taken into consideration. Ancillary board maximum current is 0.175A and status unit maximum current is 0.07A. The sum of ancillary board and status unit currents should not exceed 0.5A from either the status unit power output or the Auxiliary 24V output. If the total current required by status units and ancillary boards is 500 milliamps or greater then a separate power source with a suitable power rating must be used**.**

Four power terminals are provided so that 24V DC wiring can be taken into the ancillary board and then out again onto other ancillary boards or other equipment.

21 TO 30V DC

+ −
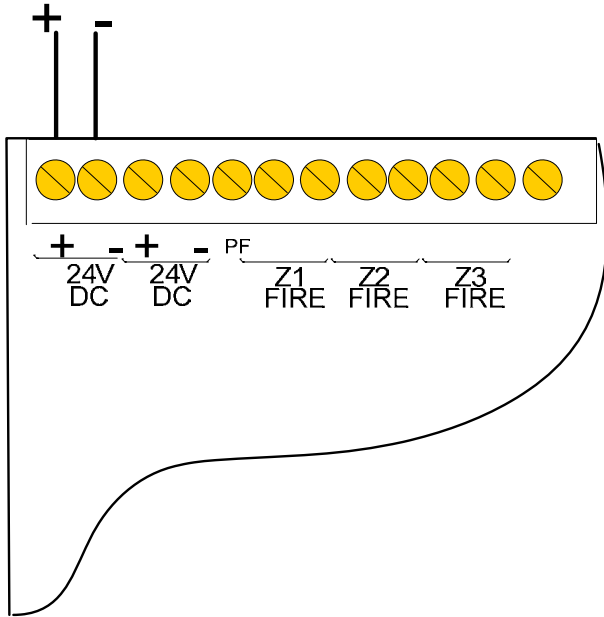
Figure 2-Power connection

+ − + − PF
24V 24V Z1 Z2 Z3
DC DC FIRE FIRE FIRE

7. Connection to Sigma XT panel

If power is supplied locally to the ancillary board only two wires are required from the Sigma XT panel.

Wiring can be standard fire alarm cable such as FP200 or shielded data cable. In either case, the shield of the cable must be securely bonded to the enclosure case.

RS 485 FROM CONTROL PANEL   **RS485 TO NEXT ANCILLARY BOARD**
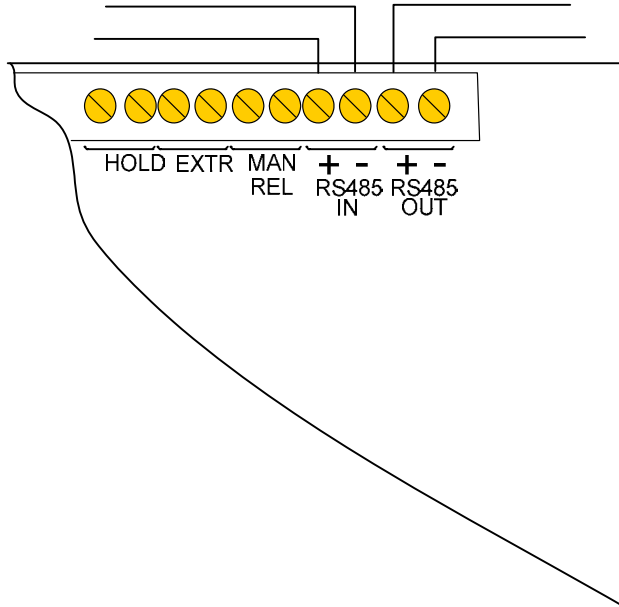
Figure 3-Comms connection

HOLD EXTR MAN + − + −
REL RS485 RS485
IN OUT

To terminate the data cable correctly, the last ancillary board or status unit connected must have jumper J2 fitted as shown below.
For the position of J2 on status units see Sigma Si Status Unit operation and maintenance manual.
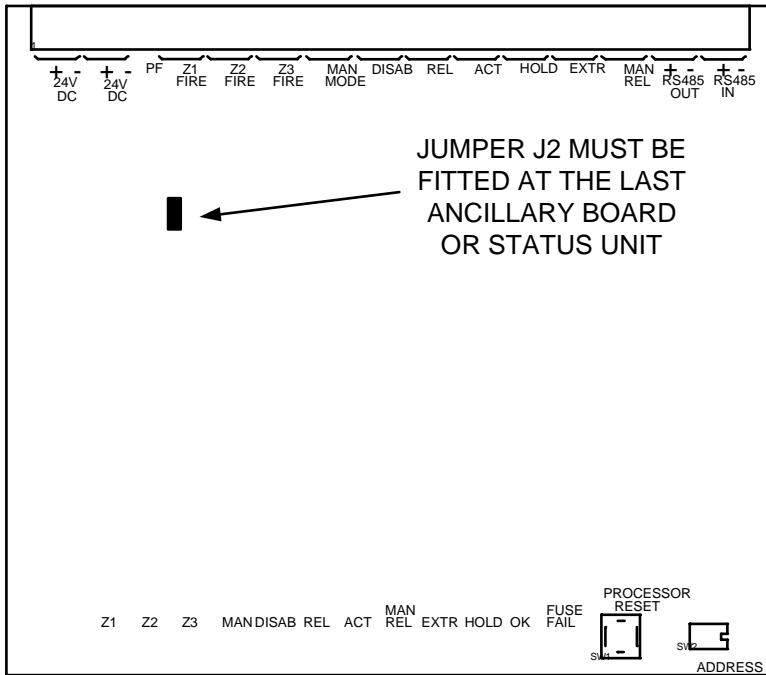
Figure 4-Comms terminating jumper

Each Ancillary board must be allocated an address as described in section 8.4.

After ancillary boards have been connected to the Sigma XT panel, the panel has to "learn" how many ancillary boards it has connected to it. This is necessary so that the panel can announce a fault condition if one or more ancillary boards become disconnected.

To "teach" the Sigma XT panel how many ancillary boards are connected, ensure that all ancillary boards have the data cable connected with the correct polarity. Check that all ancillary boards are supplied with power and that the green, OK LED is lit at each one.

Switch on the write enable switch on the Sigma XT panel and press the processor reset switch on the Sigma XT panel PCB. The panel will display the address of the first ancillary board it finds on the seven segment LED display as show below.
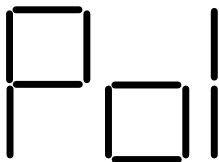
This indicates ancillary board 1 (Po1). To accept this, the enter button on the panel should be pressed whereupon, if more ancillary boards are found, their addresses will be displayed and must be accepted by pressing the enter button once again. This is repeated until all of the ancillary boards are recognised by the main panel.

If an ancillary board becomes disconnected after it is "learned" by the main panel, the main panel will display a comms fault and the number of the ancillary board on the seven segment LED display.

8. Operation

8.1 Fuse fail
The ancillary board is fitted with a 1 Amp rated, self resetting electronic fuse. This fuse protects the electronics of the ancillary board and prevents any excessive loading of the power supply that is powering it. If this fuse operates, the yellow *Fuse fail* LED will light.

8.2 OK
Indicates that the ancillary board is supplied with power and is working normally.

8.3 Reset switch
Once started, the microprocessor controlling the board should continue to run the ancillary board continuously without interruption. If the microprocessor fails to run correctly and does not re-start it can be reset by pressing the RESET button on the PCB.

This should not normally be necessary but should be done as a matter of course if the system is behaving abnormally. The system should resume normal operation within a couple of seconds of pressing the processor reset button.

8.4 Address switch
Ancillary boards can have an address in the range 1 to 7. The address is set in binary notation on the 3 way DIL switch.
Address settings are shown below.
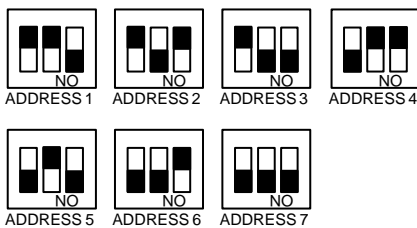
Figure 5- Address setting

9. Power requirements

The ancillary board requires a 24V DC power supply which connects to the terminal block labelled 24V DC.

The power supply should be capable of supplying a minimum of 250 milliamps to cater for a fully loaded board with all outputs activated.

An input labelled PF is provided for connection to the fault output of additional power supplies. This input needs to be switched to 0V with respect to the 24V supply to signal a power fault from the additional power supply.

When supplied from the Sigma XT panel, extra battery capacity of 0.6Ah per ancillary board connected should be allowed to give 24 Hour standby.
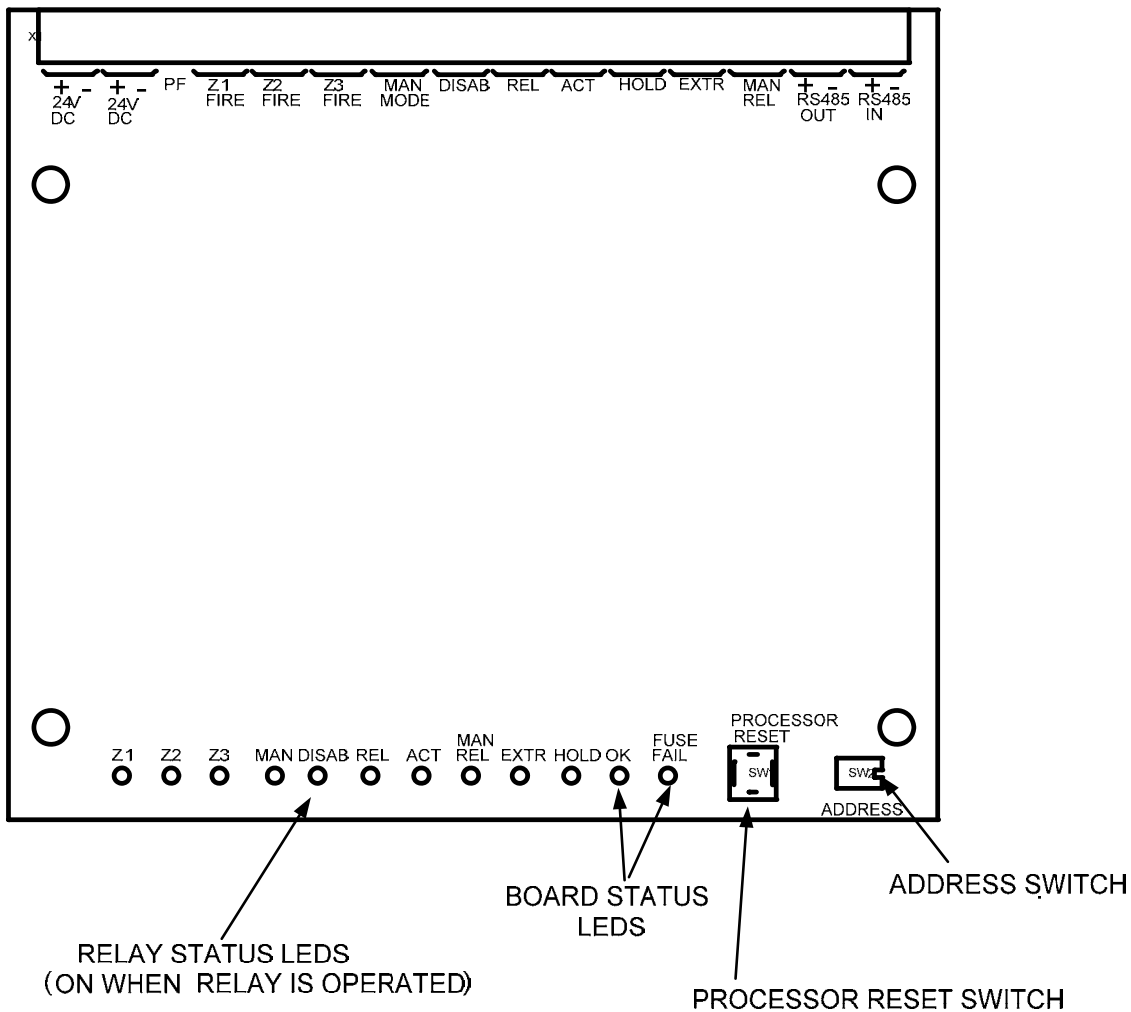
Figure 6- Overview

Fire Alarm and System Warning Signs
&
Local Control Stations

Installation and Operations Manual

Serial Communications Type

Contents

1. Introduction

SIGNS - The illuminated warning signs provide a clear, visual and audible warning for a fire alarm, extinguishant release, and System inoperative. Signs have two levels of operation in which the top and bottom halves of the sign may be split to show an initial warning and then additional text for a reinforced warning, or both halves can be activated at once.

LOCAL CONTROL STATION (LCS) may be required by standards for an installation. These units can be installed using the serial bus and can be inserted anywhere in the 485 circuit.

A maximum of 7 devices (signs/LCS) can be installed when utilising the 485 Circuit.

1.1. Sign Locations

Locations where signs must be installed are defined by AS 1670. This manual does not replace reading the full standard. Signs should be firmly mounted in appropriate locations. Interior signs are rated IP30 and are designed for indoor use only. Weatherproof Signs are available. Signs are considered by the Sigma XT FIP to be OUTPUT UNIT(S)

"FIRE ALARM/DO NOT ENTER" SIGNS - Installed outside the risk area, adjacent to all egress points and clearly visible to anyone who may enter the risk area.

"FIRE ALARM/EVACUATE AREA" SIGNS - Installed inside the risk area, adjacent to all egress points and clearly visible to all occupants of the risk area.

"EXTINGUISHING SYSTEM INOPERATIVE" SIGNS - Installed adjacent to the FIP and egress points, with additional signs where necessary to be clearly visible to anyone who enters the risk area.

1.2. Local Control Stations (LCS)

LCS should be mounted firmly in an accessible location. The LCS is considered by the Sigma XT FIP to be a STATUS UNIT(S). Status units have monitored inputs to which remote Hold or Mode select switches can be connected.

These inputs are monitored for open and short circuit faults and therefore need to have a 470R 1W trigger resistor connected in series with the activating, normally open switches and 6K8 0.5W end of line monitoring resistors connected across the end of the cables.

Status Units are environmental class A and are designed for indoor use only at temperatures between -5$_o$C (+/- 3) and +40$_o$C (+/- 2) and with a maximum relative humidity of 95%. The IP rating for the enclosure is IP30. Operation outside of these limits may render the equipment unsafe.

The 6K8 end-of-line monitoring resistors are supplied fitted to the Hold and Mode input terminals

1.3. External Devices

In addition to standard installation rules, there are some additional precautions that must be observed when installing external signs.

SUNLIGHT - If an external sign is mounted in direct sunlight, it may be difficult to see if the sign is illuminated. In this case it may be necessary to install a sun shield to make the illuminated sign visible.

DRIP LOOP - All external devices should be installed with cable penetrations coming through the bottom of the sign, with a drip loop included to avoid the accumulation and ingress of water that may damage the electronics.

1.4. Cable Penetrations and Terminations

All cable penetrations into the sign enclosures must be protected by cable glands or bushings. Each sign enclosure features a series of 20mm knockouts to accommodate these cable glands. The max size of cable that the terminals will accommodate is 2.5mm.

When preparing cable terminations, ensure that cables are not going to cross the front surface of the circuit board as this will impair the light output of the unit, and the shadows generated by the cables will be clearly visible when the sign is lit.

THIS CABLE PATH WILL CREATE SHADOWS WHEN THE LIGHTS ARE ACTIVATED.
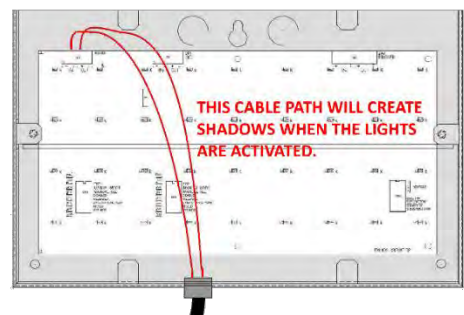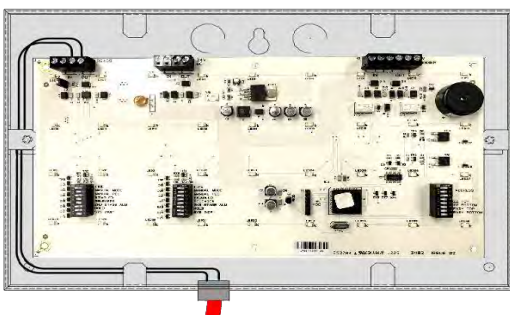
2. Mounting

2.1.   Internal Signs
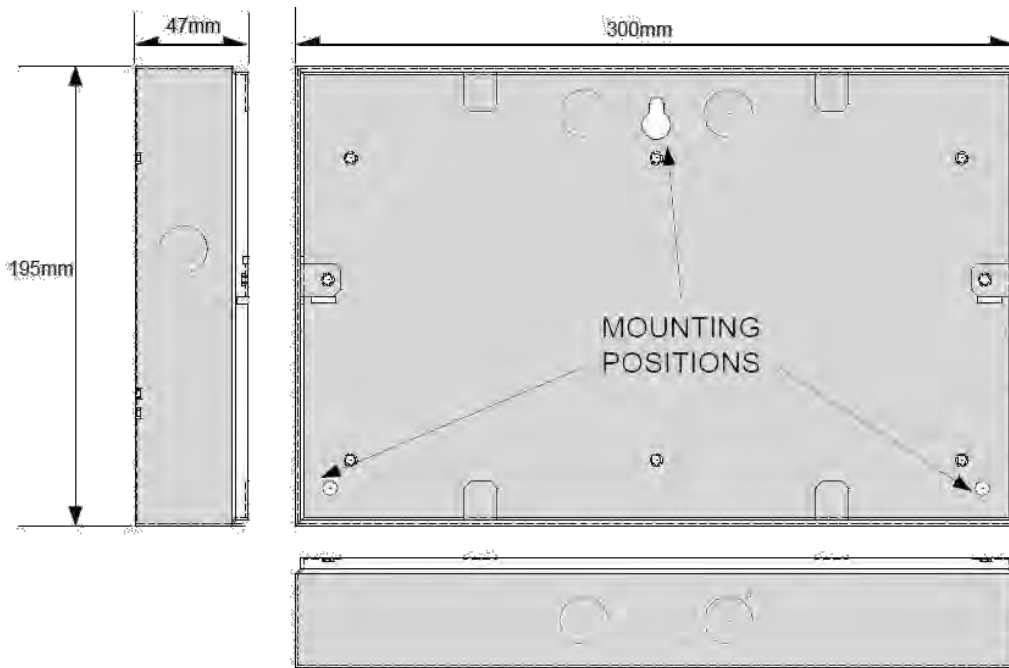
Remove Cover and Internal circuit board.

Mount using suitable fixings.

Select cable entry point and prepare.

Leave enough tail on cable to ensure the cable will not interfere with operation of sign.

2.2.   Weatherproof - External Signs

Mount Sunshade.

Remove cover and Internal circuit board

Mount using suitable fixings

ONLY Mount to sunshade surface – if the enclosure is twisted on mounting it will crack over time.

Best practice is to use silicon for securing the lower half of sign.

Select cable entry point and prepare. Cable entry must have cable gland fitted. Preferred entry though base of sign with drip loop in cable.

Leave enough tail on cable to ensure the cable will not interfere with operation of sign.

3. Power and Data Connections

Each status unit requires two cores for power and two cores for data transmission to and from the control panel. A four core cable may be used for these connections. All of these connections are polarity conscious and care should be taken to match the polarity with the corresponding terminals at the control panel.

3.1. Connecting Signs with RS485 Serial

3.1.1. Connecting up to 3 Signs

For systems requiring up to 3 signs (or devices) to be installed, wiring is as follows:

Notes:
- FIP MUST BE POWERED DOWN BEFORE ANY CHANGES TO SIGNS.
- STATUS POWER - will support a maximum of 3 devices, including both signs and LCS.
- For more than 3 signs, a separate power supply is required from the 24VDC output on the FIP.
- STATUS SERIAL (RS485) - Maximum number of devices, including both Signs and LCS, for the 485 communications is 7.
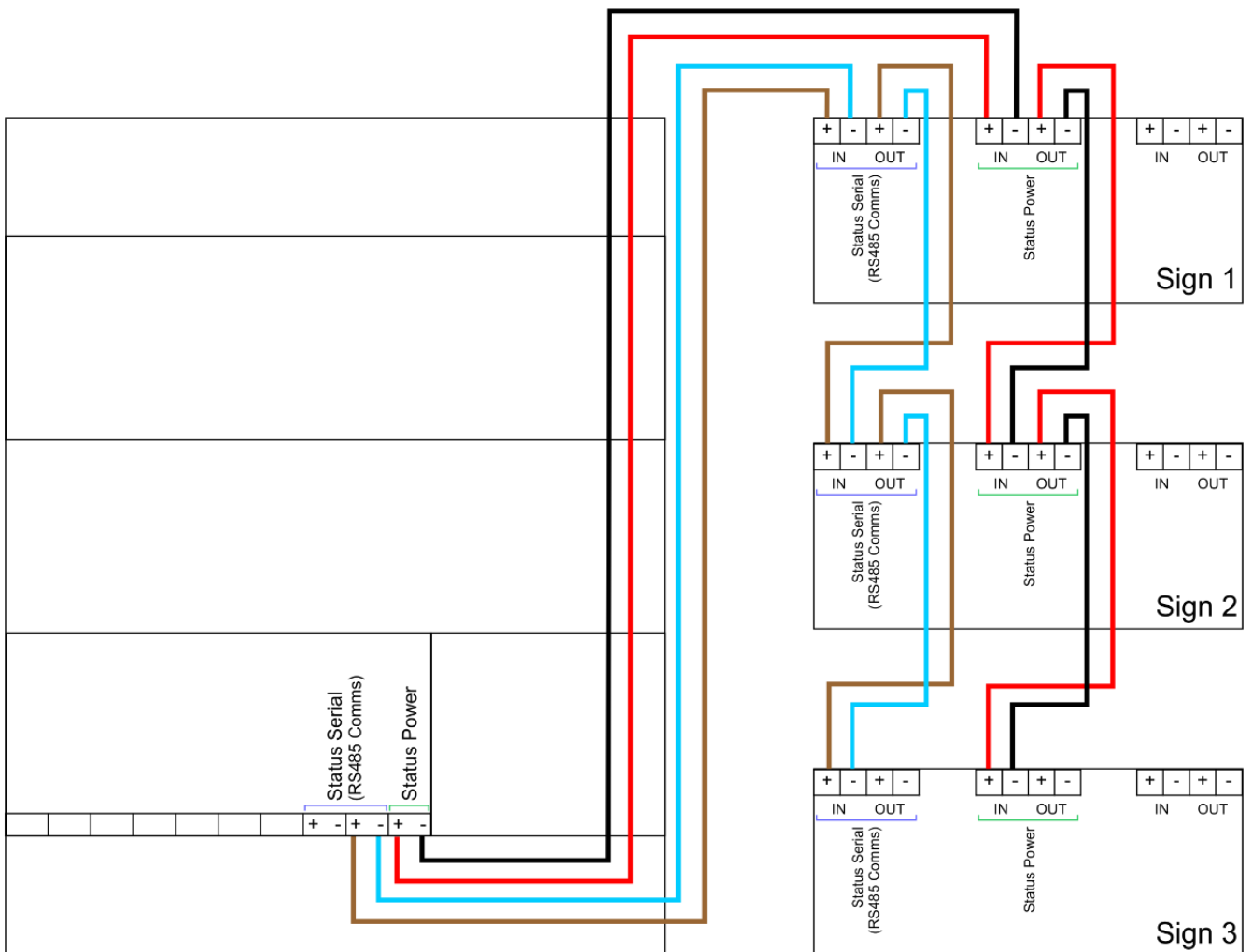
3.1.2. Connecting more than 3 Signs

For systems requiring more than 3 signs (or devices), wiring is as follows:

Notes:
- FIP MUST BE POWERED DOWN BEFORE ANY CHANGES TO SIGNS.
- Connections for the first 3 signs or devices remains the same as the previous wiring diagram.
- For more than 3 signs, a separate power supply is required from the 24VDC output on the FIP.
- STATUS SERIAL (RS485) - Maximum number of devices, including both Signs and LCS, for the 485 communications is 7. RS485 connection remains the same for all 7 devices.

Continue up to Sign 7
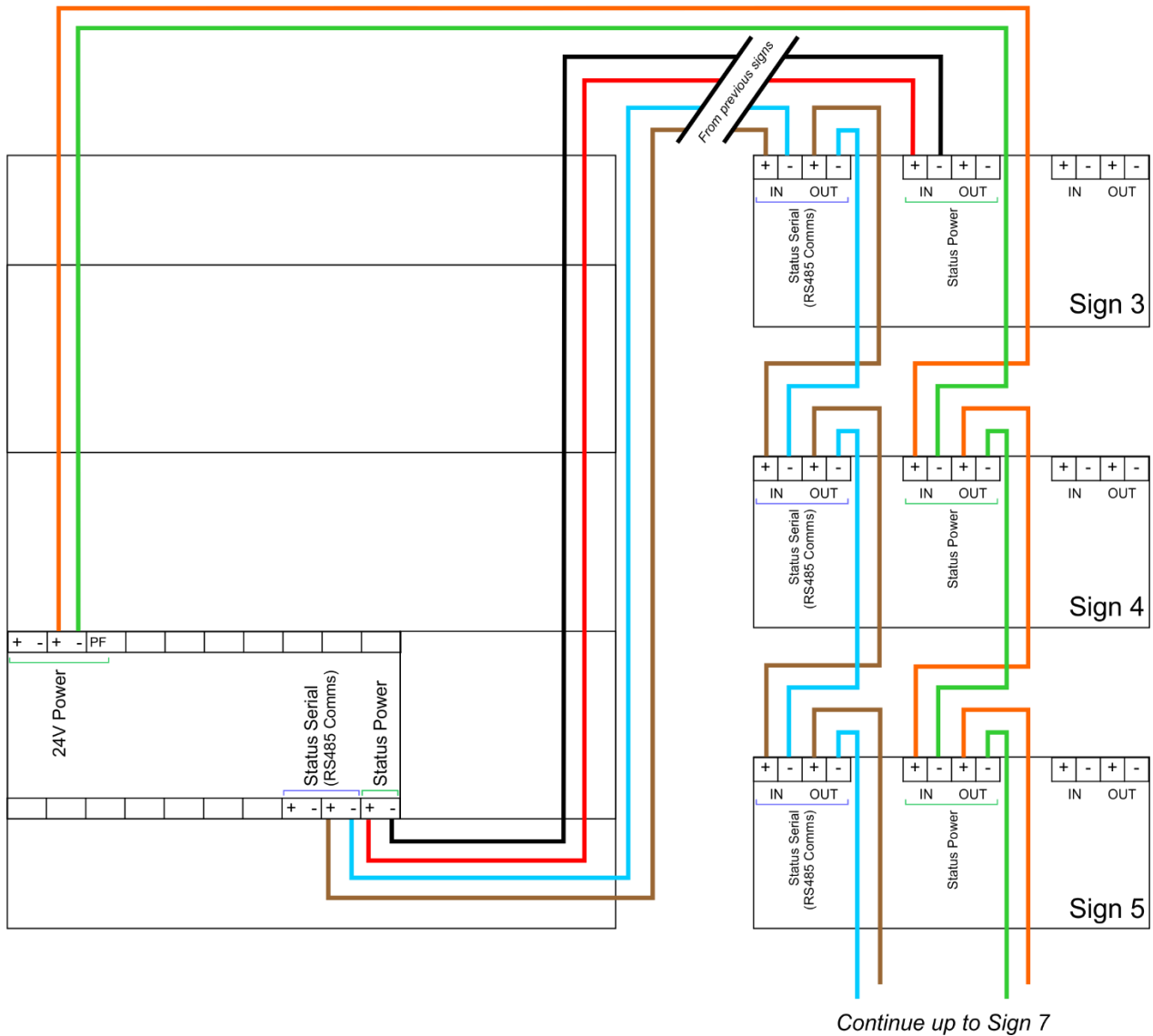
4. Connection of Local Control Station (LCS)

4.1. Power and Data Connection

The LCS can be installed in any order on the STATUS SERIAL (RS485) circuit, depending on its location. The LCS must be installed on the STATUS SERIAL (RS485) circuit. It cannot be used as a mimic device. More information is available on the Local Control Station Manual.

For systems requiring a LCS to be installed, wiring is as follows:

Notes:
- FIP MUST BE POWERED DOWN BEFORE ANY CHANGES TO SIGNS.
- If installed as one of the first 3 devices on the STATUS SERIAL (RS485) circuit, STATUS POWER may used for the power supply.   STATUS POWER will support a maximum of 3 devices, including both signs and LCS.
- If installed after the first 3 devices on the STATUS SERIAL (RS485) circuit, a separate power supply is required from the 24VDC output on the FIP.
- STATUS SERIAL (RS485) - Maximum number of devices, including both Signs and LCS, for the 485 communications is 7.
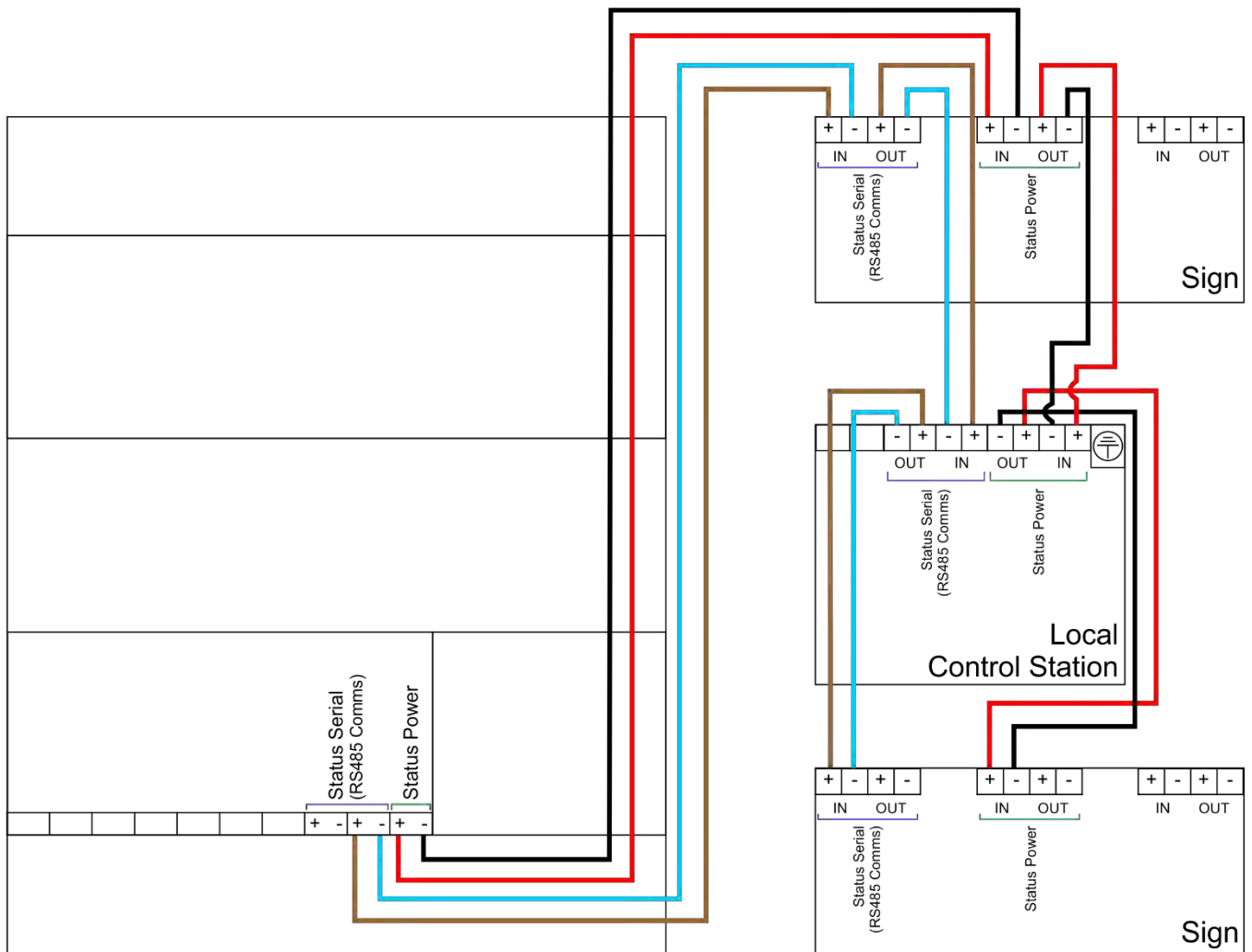
4.2. Connection to Hold and Mode inputs

Status units have monitored inputs to which remote Hold or Mode select switches can be connected. These inputs are monitored for open and short circuit faults and therefore need to have a 470R 1W trigger resistor connected in series with the activating, normally open switches and 6K8 0.5W end of line monitoring resistors connected across the end of the cables.

The 6K8 end-of-line monitoring resistors are supplied fitted to the Hold and Mode input terminals and the 470R trigger resistors are supplied in the accessory bag with the status unit. If either of these inputs are not being used then the end of line monitoring resistors should be left in the Hold and/or Mode terminals.
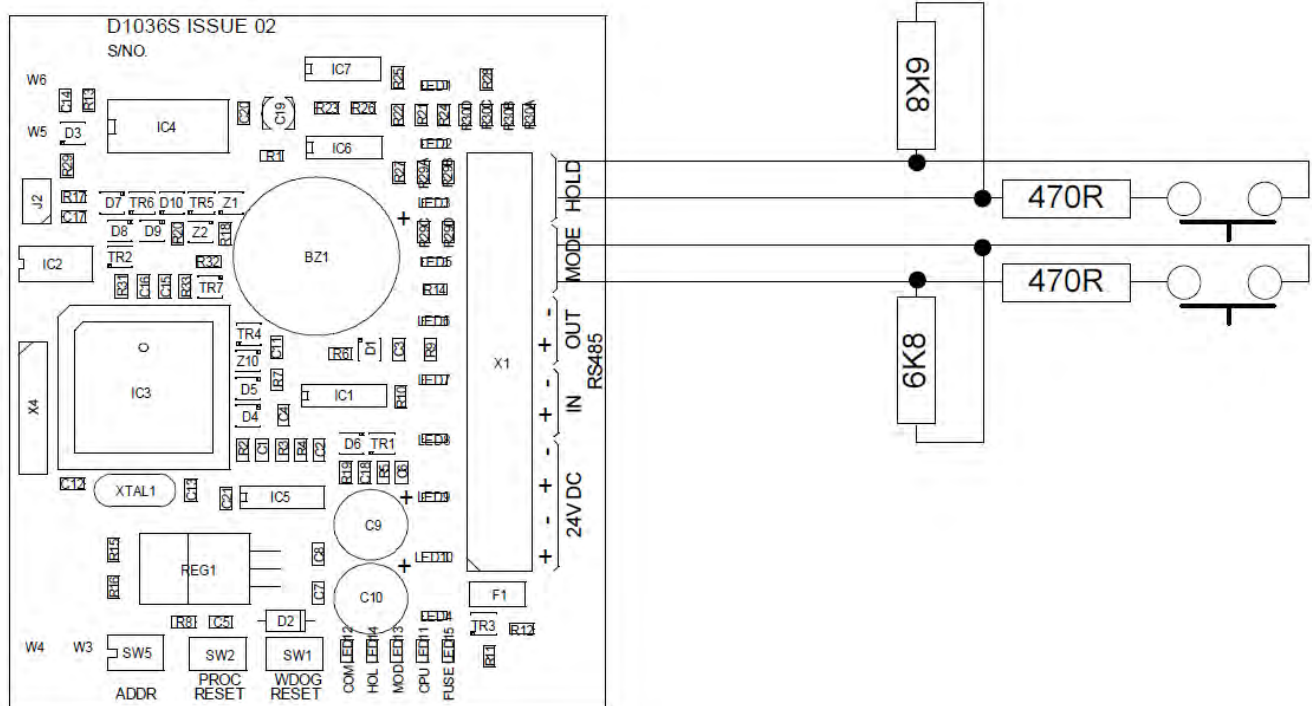
4.3. Mode input

The mode input is provided to allow connection of remote mode switch or to connect to door interlock contacts. The system is designed such that any Manual only mode input on the system that is active (input operated by 470R trigger resistor) will put the system into Manual only mode regardless of the status of any other Mode inputs. Therefore, for the system to be in Automatic and manual mode, all Mode inputs must be inactive.

Indication of the Mode is given on the front of the status unit by the Manual only or Automatic and manual LEDs.

4.4. Hold input

When active (input operated by a 470R trigger resistor) the Hold input allows the extinguishant release countdown timer to be reset to its maximum time. When the input is de-activated the countdown to extinguishant release will re-start at the maximum time that is configured at the panel (0 to 60 seconds).

IMPORTANT NOTE: When there is a fault on the HOLD input then the HOLD function is invoked which means that the extinguishant release will not operate until this condition is cleared.

4.5. Mode select keyswitch

Some models of the status units have a mode select switch. The operation of the Mode select switch is as per the Mode input above.

4.6. Manual release

Where fitted, a manual release button replicates the action of the manual release control at the main control panel and once activated will start the extinguishant release sequence.

A plastic seal is provided in the accessory pack and should be fitted to the manual release flap with a piece of thin wire to provide an indication if the manual release has been tampered with.

3 Processor and watchdog reset switches

4.7. Processor and Watchdog Reset Switches

The status unit is controlled by a microprocessor, which will re-start itself and continue to run if it stops for any reason such as severe electrical interference such as an electrical storm.

To ensure that the unit is not being subjected to continual, undue interference which may affect its proper operation, a CPU fault indicator is latched on and a fault condition signalled to the control panel.

If a processor re-start has occurred this latched fault condition will need to be reset by pressing the WDOG RESET button on the bottom of the PCB.

A switch is also provided to manually re-start the processor PROC RESET. This switch can be used while the status units are connected to the system to ensure that the unit starts up and establishes communication with the panel in a controlled and expected manner.
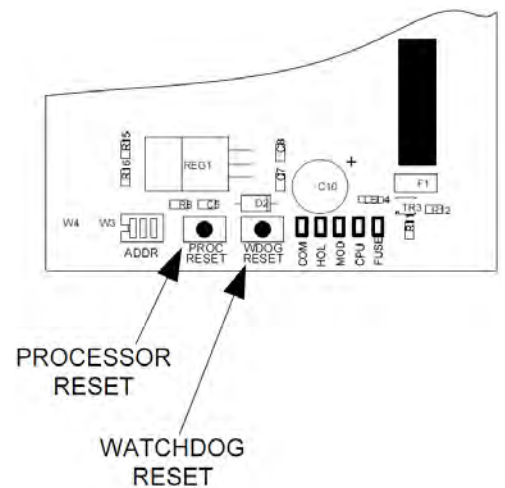
4.8. Internal fault indications

An extinguishant fault indication at the control panel may mean that there are faults at one or more status units. The status unit fault indications are located along the bottom of the PCB and are as follows:

4.8.1. COM

This LED indicates that the data communications connection to the control panel is not present. This may be because the data lines are connected with reverse polarity or are not connected. Check RS485 IN and OUT connections.

4.8.2. LOCK OFF

This LED indicates that the Lock Off input is open or short circuit. Check that the correct end of line resistor is connected to the Lock Off terminals or at the end of the wires connected to the Lock Off terminals and that the Lock Off input is not short circuited, or the wiring open circuited.

IMPORTANT NOTE: When there is a fault on the Lock Off input then the Lock Off function is invoked which means that the extinguishant release will not operate until this condition is cleared.

4.8.3. MOD

This LED indicates that the MODE input is open or short circuit. Check that the correct end of line resistor is connected to the MODE terminals or at the end of the wires connected to the MODE input and that the MODE input is not short circuited.

4.8.4. FUSE

This LED indicates that the electronic fuse has operated. Under this condition, the status unit is not operational. This may be due to incorrect polarity of the power connection or a failure on the unit itself.

FAULT
INDICATIONS
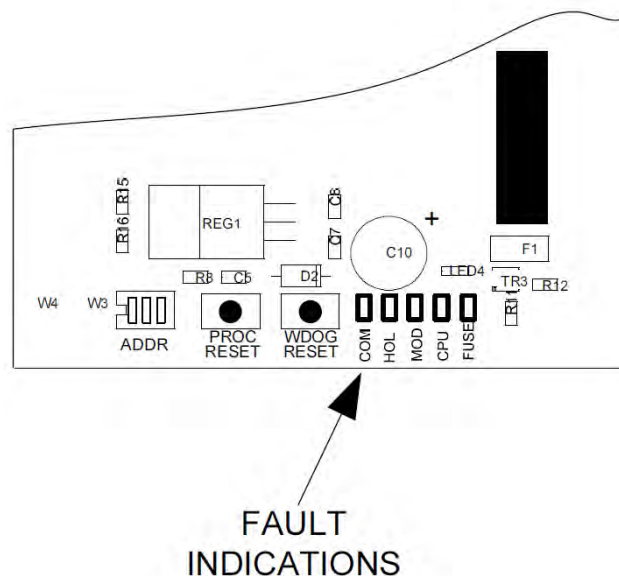
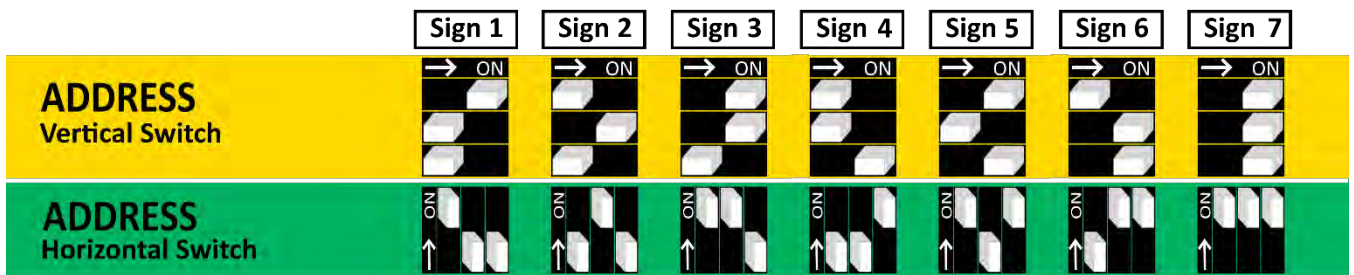# 5. Setting up the Devices
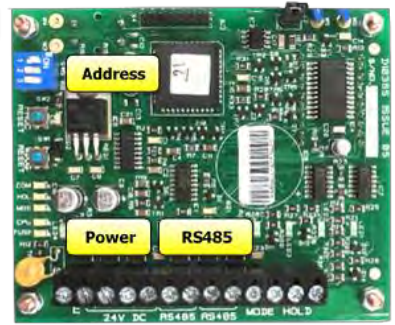
Sign Circuit Board   LCS Circuit Board

5.1. Addressing Devices

Before adding a device to the FIP's programming, each device connected to the STATUS SERIAL (RS485) circuit must be given an individual address. The FIP MUST BE POWERED DOWN BEFORE ANY CHANGES TO DEVICES.

IMPORTANT - Devices with the same address will cause an intermittent fault to be displayed.

5.2. Assigning Sign Function

In addition to addressing, signs connected to the STATUS SERIAL (RS485) circuit require their function to be set using the DIL switches on the bottom of the sign circuit board. The functions of the upper and lower halves of the sign are split across 3 banks of DIL switches. The recommended sign functions for each type of sign are:
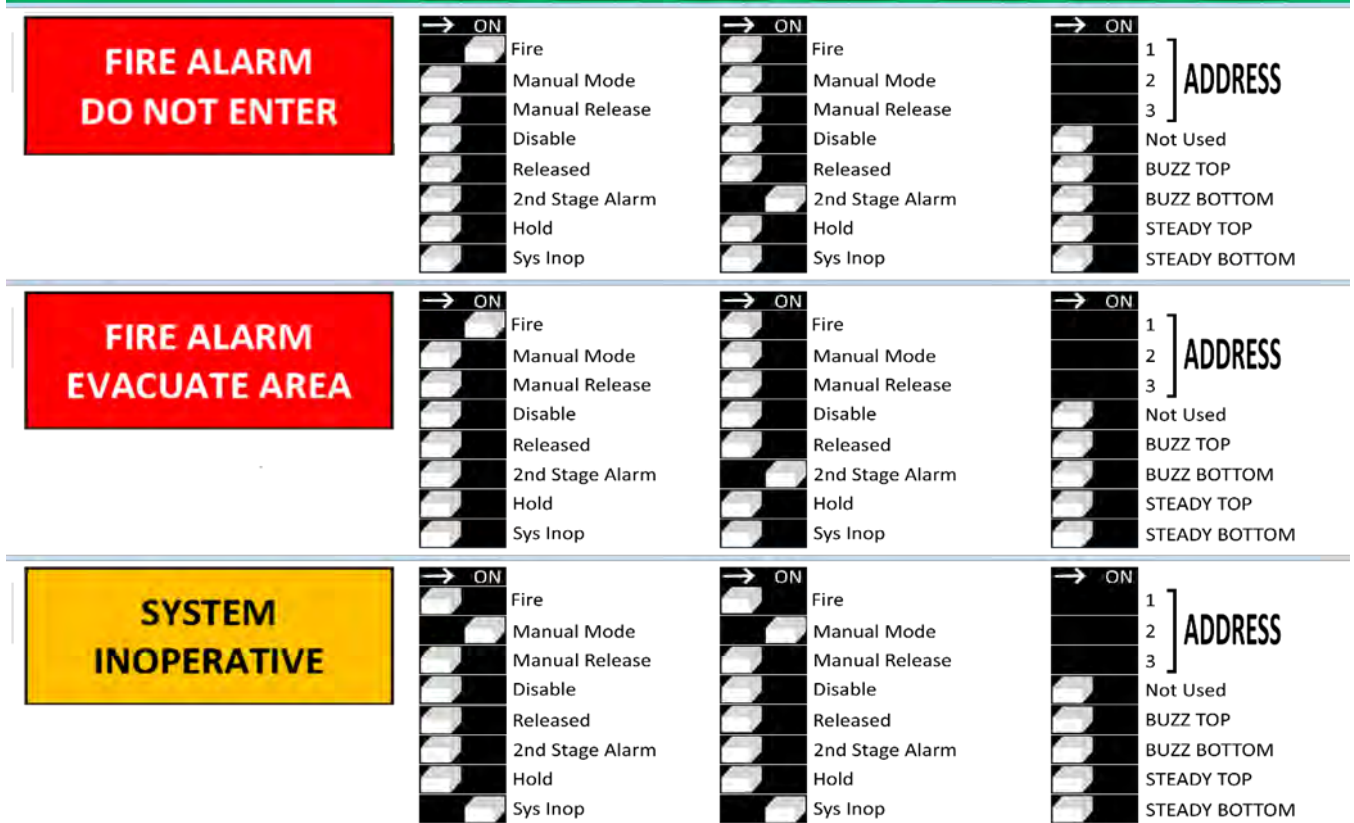
6. Adding Devices to FIP Programming

In order to add or remove devices from the FIP programming, the FIP must be in "ACCESS LEVEL 3".

The steps to enter "ACCESS LEVEL 3" are as follows:

1. **Unlock and open the centre display window. This operates a read switch on the door that enables "ACCESS LEVEL 2".** The centre lock opens the display window, allowing for operation of the controls.

2. Unlock and open the main door for the FIP. The top and bottom locks will open the complete cabinet front allowing for full access to the FIP controls. Ensure that the display window is kept open.

3. Move the Write/Enable switch on the lower extinguishant module to the left "Write" position. This enable "ACCESS LEVEL 3" and allows for programming of the signs.
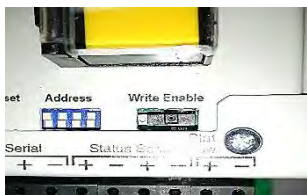
Normal – The Slide Switch is to the Right
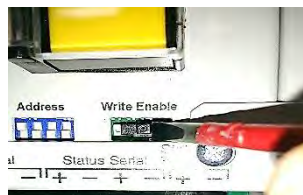
To Access Level 3 – move the Slide Switch to the Left

Access Level 3 – The Slide Switch is to the Left

> A "CONFIG WP" Fault will show if the Slide Switch **is not returned "ENABLE"**.

6.1. Adding / Removing Devices at the FIP

FIP SHOULD BE POWERED DOWN before any changes are made to status units. When the system is first powered on, it will search for connected status units connected to extinguishant module. If status units are connected correctly and detected by the control FIP, the LCD will display:

> X FAULTS
> Enter TO VIEW

Open the *Display* Window and Press *Enter* on the module to which the status units are connected. Use the **"+"** button on the module to view the faults. If status units are detected the LCD will display, X = the address of the status unit found.

> STATUS UNIT X
> FAULT

To accept the status units found, slide the WRITE ENABLE switch, on the module to which the status units or ancillary boards are connected to write mode. The LCD will then display, X= the address of the status unit found.

> STATUS UNIT X
> Enter TO ACCEPT

Then press the *Enter* button, the selected status unit or ancillary board will be added to the system and the next unit to be added will be displayed. Press the *Enter* button on the extinguishant module until all the units have been accepted then slide the *Write Enable* switch to enable mode.

All of the status units found module have now been added and disconnection of any of them will be displayed as a fault on the module and on the detection part of the system. If any status units are disconnected, a Lock Off activated indication will also be displayed at the extinguishant module and all ancillary boards or status units that remain connected. With the *Display Window* Closed, the LCD will display:

> REMOTE BUS
> FAULT

The Status units which are disconnected will have all their indicators flashing. When additional status units are added, these will be shown on the LCD when the system is powered up.

7. Alternative Sign Arrangements

7.1. Mimic Signs / Connecting more than 7 Signs

In systems that require more than 7 signs, additional signs may be installed by connecting to the 24VDC TRIGGER terminals located in each sign. This allows connected signs to mimic the operation of a sign that is connected to the STATUS SERIAL (RS485) circuit. Note: signs can only mimic other signs of the same type (A "Do Not Enter" Sign can only mimic another "Do Not Enter" Sign).
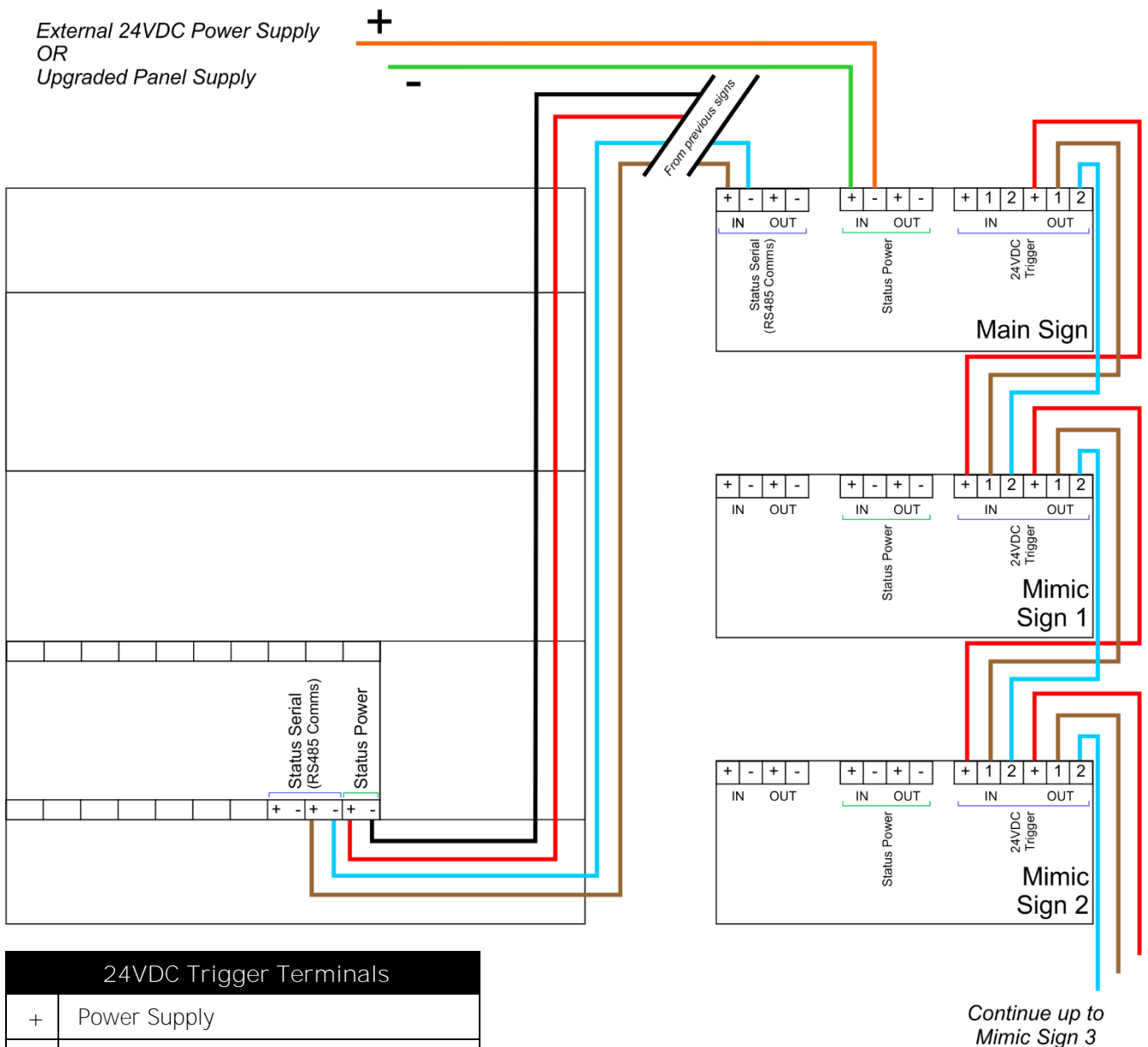
The 24VDC trigger function of each sign connected to the STATUS SERIAL (RS485) circuit can support up to 3 additional signs.

There is no need to configure the address or sign function switches, however the internal buzzer and flashing functions can still be adjusted separately.

IMPORTANT – An additional external power supply OR an upgraded power supply in the FIP is required for any additional devices over the standard maximum of 7 devices. Each sign has a current draw of 140mA. When installing, power supply (including backup supply) must be assessed to ensure that it will be adequate.

While it is possible to use this configuration with fewer than 7 devices, it is not recommended.

The LCS must be installed on the STATUS SERIAL (RS485) circuit. It cannot be used as a mimic device.

24VDC Trigger Terminals	
+	Power Supply
1	Controls LOWER half of mimic sign
2	Controls UPPER half of mimic sign

7.2. Alternative Arrangement of STATUS SERIAL (RS485) Circuit.

The standard arrangement for installing signs is to have a single STATUS SERIAL (RS485) cable connecting the FIP to the signs, as per wiring diagram. However, it can be configured to have 2 separate cables for the RS485 circuit with the FIP effectively in the middle of the circuit rather than at one end.

FIP MUST BE POWERED DOWN BEFORE ANY CHANGES TO SIGNS. If process is done with power connected the is a possibility that a short could occur and damage the FIP.

IMPORTANT - When this configuration is used the LK2 link on the extinguishant module MUST be removed or positioned over 1 pin only, or the FIP will register a fault.

An example of this type of wiring arrangement is as follows:

LK2
located on back of
Extinguishant Module
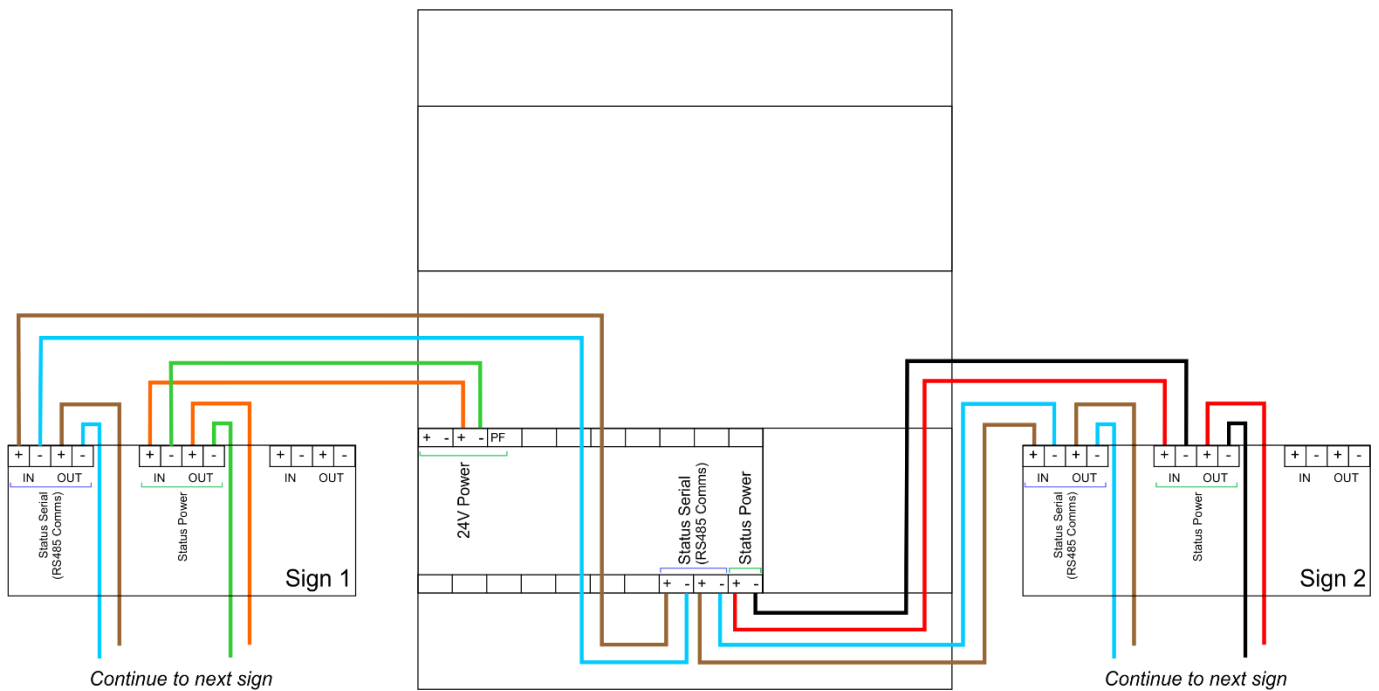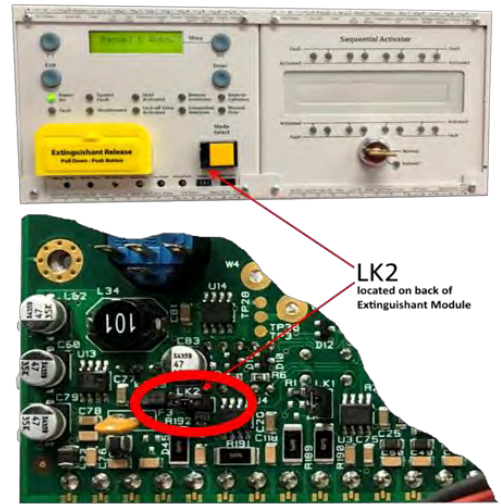
8. Troubleshooting

OUTPUT UNIT X   →
FAULT

Output Unit refers to a SIGN, this fault will be

- Address is the same as another device in the 485 circuit
- Power has failed to the sign.
- RS485 signal has failed to the sign.

STATUS UNIT X   →
FAULT

Status Unit refers to an LCS, this fault will be

- Address is the same as another device in the 485 circuit
- Power has failed to the LCS.
- RS485 signal has failed to the LCS.

9. Specifications

	Internal Sign	External Sign	Local Control Station
Size	195 x 300 x 50mm	195 x 300 x 50mm	135 x 186 x 50mm
Material	1.2mm steel Epoxy coat	Thermoplastic	1.2mm steel Epoxy coat
IP Rating	IP 40	IP 55	IP 40
Op. Voltage	15V to 30V DC	15V to 30V DC	21 to 30v DC
Current – Quiesant	20 mA	20 mA	60 mA
Current – Alarm State	140 mA	140 mA	70 mA

Fire Alarm Interface

Vizulinx

Product Manual

Safety

Suppliers of articles for use at work are required under section 6 of the Health and Safety at Work act 1974 to ensure as reasonably as is practical that the article will be safe and without risk to health when properly used.
An article is not regarded as properly used if it is used 'without regard to any relevant information or advice' relating to its use made available by the supplier.

This product should be installed, commissioned and maintained by trained service personnel in accordance with the following:

- EE regulations for electrical equipment in buildings

- Codes of practice

- Statutory requirements

- Any instructions specifically advised by The Manufacturer

According to the provisions of the Act you are therefore requested to take such steps as are necessary to ensure that you make any appropriate information about this product available to anyone concerned with its use.

The mains powered version of this equipment is designed to be operated from 230V 50Hz mains supplies and is of class 1 construction. As such it **must** be connected to a protective earthing conductor in the fixed wiring of the installation and a readily accessible double pole disconnect device shall be incorporated in the fixed wiring.

Failure to ensure that all conductive accessible parts of this equipment are adequately bonded to the protective earth will render the equipment unsafe.

Disclaimer

In no event shall The Manufacturer be liable for any damages or injury of any nature or kind, no matter how caused, that arise from the use of the equipment referred to in this manual.
Strict compliance with the safety procedures set out and referred to in this manual, and extreme care in the handling or use of the equipment, are essential to avoid or minimise the chance of personal injury or damage to the equipment.

The information, figures, illustrations, tables, specifications, and schematics contained in this manual are believed to be correct and accurate as at the date of publication or revision. However, no representation or warranty with respect to such correctness or accuracy is given or implied and The Manufacturer will not, under any circumstances, be liable to any person or corporation for any loss or damages incurred in connection with the use of this manual. The information, figures, illustrations, tables, specifications, and schematics contained in this manual are subject to change without notice.

Unauthorised modifications to the fire detection system or its installation are not permitted, as these may give rise to unacceptable health and safety hazards.

By installing this equipment on a computer network, the owner accepts full and unequivocal responsibility for ensuring that it is protected against all cyber threats and illegal tampering during the lifetime of the equipment.Any software forming part of this equipment should be used only for the purposes for which The Company supplied it. The user shall undertake no changes, modifications, conversions, translations into another computer language, or copies (except for a necessary backup copy).In no event shall The Manufacturer be liable for any equipment malfunction or damages whatsoever, including (without limitation) incidental, direct, indirect, special, and consequential damages, damages for loss of business profits, business interruption, loss of business information, or other pecuniary loss, resulting from any violation of the above prohibitions.

Vizulinx should not be used as primary notification and is to support and provide additional means of communication only.

Section 1
Introduction

Vizulinx is a standalone, low power module which adds expanded connectivity to Kentec fire alarm control and extinguishant panels. The module reports fire alarm behaviour on site, over email, SMS and communicates with building management systems (using BACNet/Modbus protocols).

The diagram below shows Vizulinx module capabilities ('M2' enclosure version):

Example Fire Alarm Control Panel Network
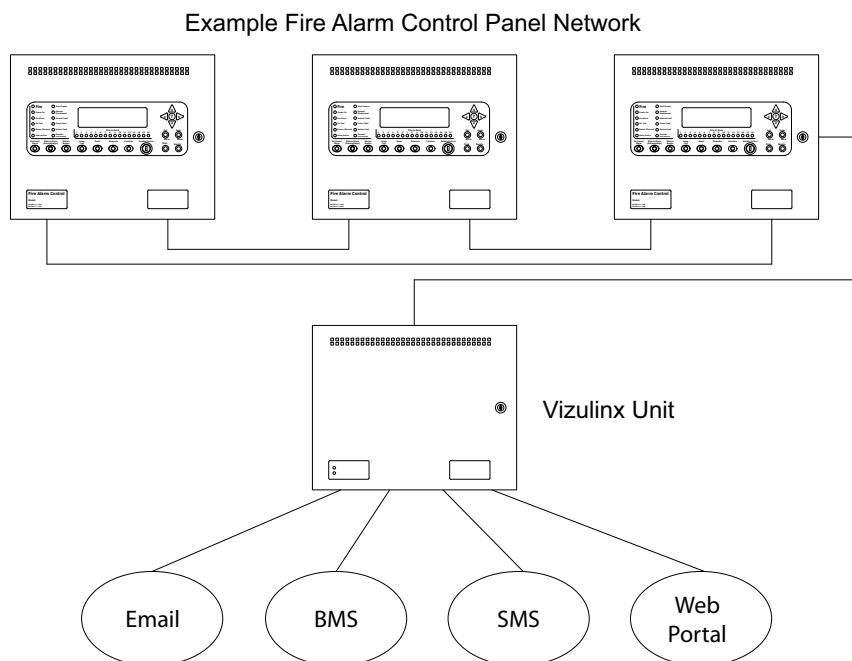
Email
Provides fire and an optional fault notification via email. Requires an internet based email service or local web server access.

BACnet or MODBUS (for BMS Integration)
Vizulinx can connect to a panel (or network of panels) to building management or building automation systems using Modbus (TCP/IP) or BACnet (IP) protocols.

Mobile Text Messaging
Sends fire and fault message via GSM or 'Text Magic' internet service (requires third-party USB GSM/WiFi dongle).

Web Portal
Provides local network access via web browser to real time and provides access historic fire and fault events.

Backup/Restore
Downland panel configuration, store multiple versions and restore on demand. Downloads via the web portal.

Section 2
Overview

This manual covers the installation and operation of the following products:

Vizulinx - Module Only
• Part number – K85000.
• DIN rail mountable Vizulinx module only.
• Ribbon cable (x2) to connect to 8 outputs, giving up to 16 programmable input channels, which may be used for common fire/fault or zonal signalling from conventional panels.
• Ribbon cable for serial connection to Syncro and Elite model control panels.
• Ribbon cable for PSU fault monitoring.

Vizulinx Housed - M2 Enclosure
• Part Number – K85000 M2.
• Vizulinx module fitted.
• Housed in an sheet steel enclosure complete with S407 2.5A power supply and space for up to 2 x 7Ah sealed lead acid batteries (9.5Ah high capacity batteries).
• Enclosure finish - Grey (Bs-oo-A-05)

Vizulinx Housed - AM3 Enclosure 110V AC
• Part Number – K85110 AM3.
• Vizulinx module fitted.
• Housed in an sheet steel enclosure complete with S407 2.5A power supply and space for 2 x 12Ah sealed lead acid batteries.
• Enclosure finish - Red (RAL 3002)

Vizulinx Housed - AM3 Enclosure 230V AC
• Part Number – K85240 AM3.
• Vizulinx module fitted.
• Housed in an sheet steel enclosure complete with S407 2.5A power supply and space for 2 x 12Ah sealed lead acid batteries.
• Enclosure finish - Red (RAL 3002)

Supported Kentec Electronics Panels
This document provides installation and set-up information for the following Kentec products:
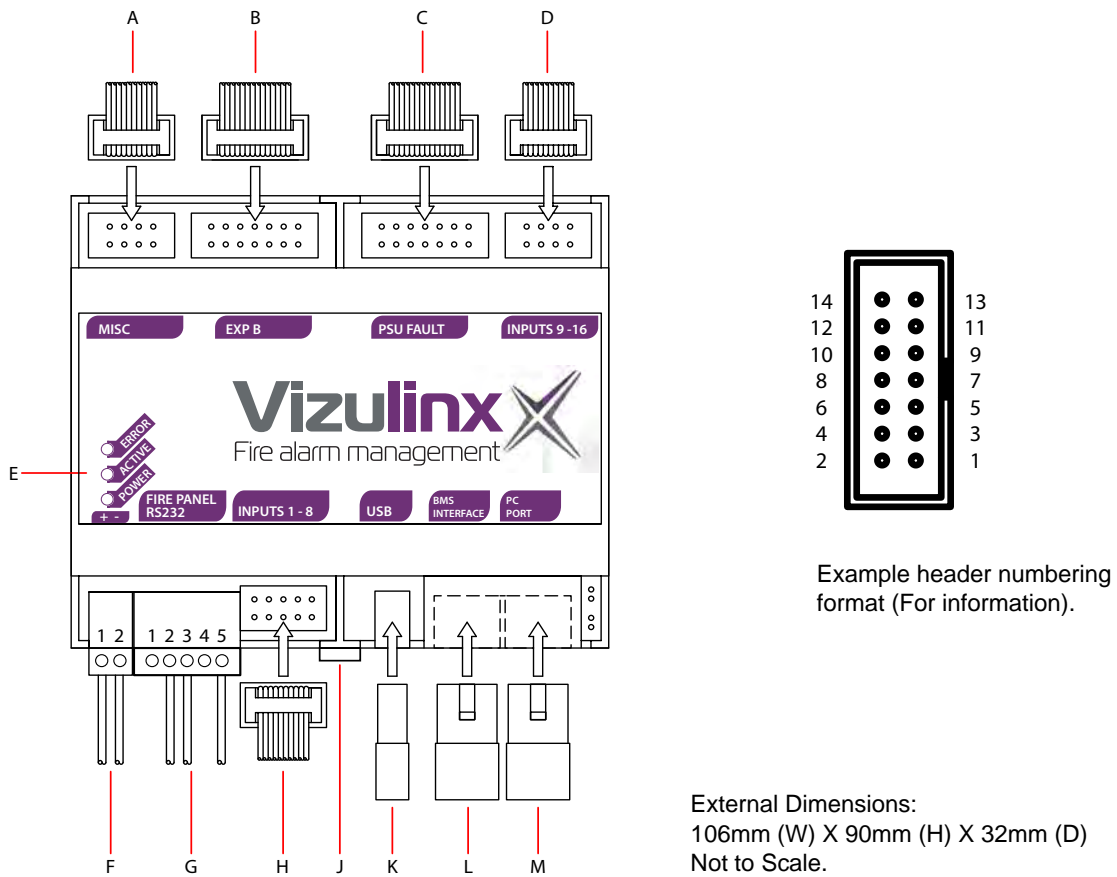
Product	Connection Type
Taktis EN	IP via Media Gateway Card
Taktis UL	IP via Media Gateway Card
Syncro	Serial via PC Port
Syncro AS	Serial via PC Port
Elite	Serial via PC Port
Elite RS	Serial via PC Port
Sigma CP	GPIO (General Purpose Inputs & Outputs)
Sigma XT	GPIO (General Purpose Inputs & Outputs)
Sigma A-CP	GPIO (General Purpose Inputs & Outputs)
Sigma A-XT	GPIO (General Purpose Inputs & Outputs)

| Product	Connection Type
Sigma XT+	GPIO (General Purpose Inputs & Outputs)

Note: Vizulinx is compatible with all OEM branded variants of the above listed products.

Figure 2-1
Overview of Vizulinx Module features

Example header numbering format (For information).

External Dimensions:
106mm (W) X 90mm (H) X 32mm (D)
Not to Scale.

Key	Feature	Description
A	MISC	Not used.
B	EXP B	Not used.
C	PSU FAULT	Power supply unit fault monitoring input.
D	GPIO 9-16	Connection for Sigma CP, A-CP, XT, A-XT, XT+ (and other GPIO).
E	ERROR	When illuminated denotes an error
	ACTIVE	When illuminated denotes activity: >15 seconds during boot up. 0.25 second flash every10 seconds, denoting data being passed.
	POWER	When illuminated denotes power healthy.
F	POWER INPUT	Terminal 1: 9 - 30V DC.
		Terminal 2: 0V.
G	RS232 INPUT	For Syncro, Syncro AS, Elite and Elite RS connection.
H	GPIO 1 - 8	Connection for Sigma CP, A-CP, XT, A-XT, XT+ (and other GPIO).
J	DIN Rail release tab	Pull down to release module.
K	USB	For USB A connectivity (GSM dongle, WIFI etc).
L	BMS INTERFACE	Ethernet connection to BMS or Taktis.
M	PC PORT	Ethernet connection to PC for programming or LAN.

Figure 2-2
Overview of Vizulinx module housed - M2

88.1

385.8

305.6

Not to Scale.

A
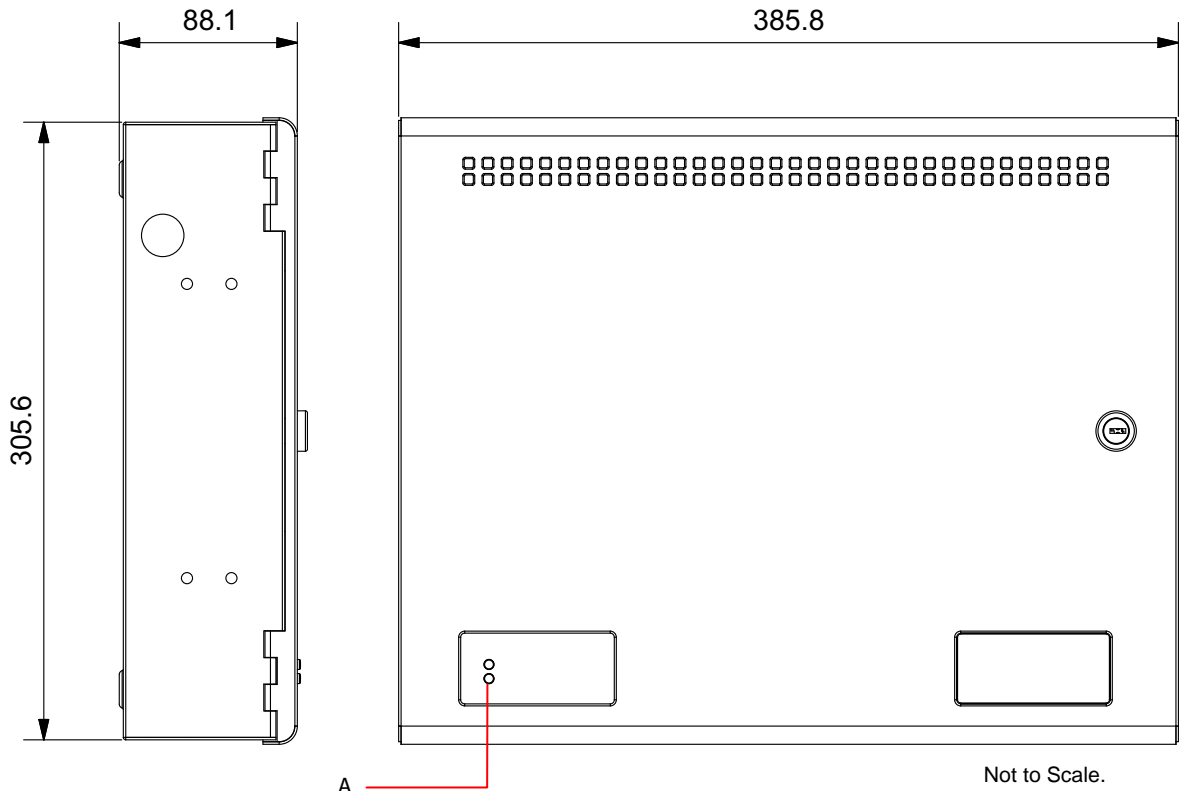
INTERNAL LAYOUT

Key	Description
A	Power On/Power Fault status indicators.
B	Knock-outs for cable entry.
C	Upper enclosure fixing hole (x1).
D	Power supply.
E	Vizulinx module.
F	Enclosure chassis.
G	Space for batteries.
H	Lower enclosure fixing holes (x2).

Figure 2-3
Overview of Vizulinx module housed - AM3

106.6

369.4

475.6

Not to Scale.

A

INTERNAL LAYOUT

B
C

D

E

F

G

H

J

Key	Description
A	Power On/Power Fault status indicators.
B	Enclosure earth block.
C	Knock-outs for cable entry.
D	Upper enclosure fixing holes (x2).
E	Vizulinx module.
F	Power supply.
G	Enclosure chassis.
H	Space for batteries.
J	Lower enclosure fixing holes (x2).
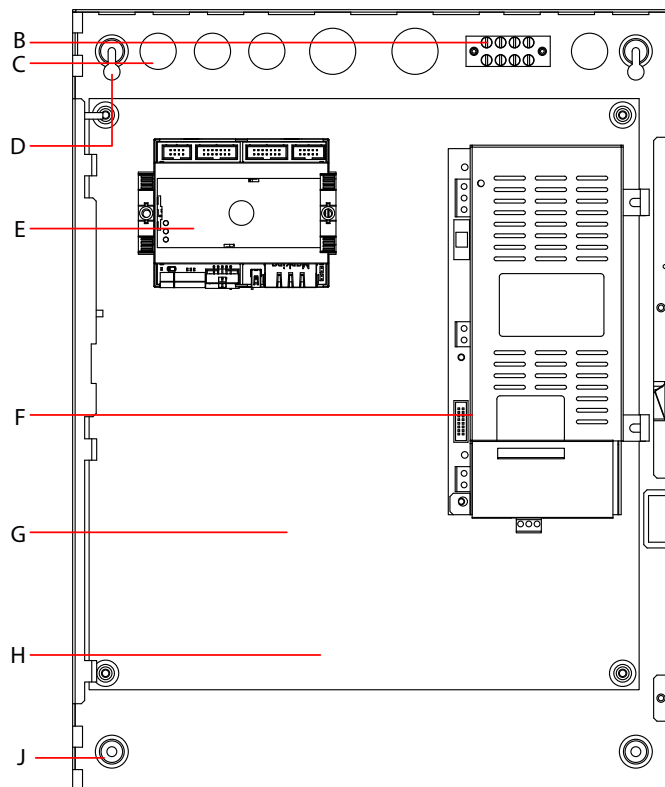
Section 3
Installation

This section provides installation instructions for mounting the enclosure and connecting cables. This product should be installed, commissioned and maintained by trained service personnel in accordance with the terms outlined at the beginning of this document.

General Installation Process

1. Create a plan and checklist for the installation.
2. Remove the panel packing and check the contents.
3. Mount the enclosure.
4. Connect cables.
5. Apply power.
6. Configuration.
7. Test.

Mounting Vizulinx (module only version)

- The module can be mounted using 35mm DIN rail (allowing for fixings, approximately 150mm long).

- The module is secured to the DIN rail by the black tab, the tab can be eased outwards to facilitate mounting or dismounting.

- Appropriate DIN rail end stops must be used to prevent the module sliding along the DIN rail.

- The module must be mounted/fixed in a suitable third party enclosure.

Mounting Vizulinx (housed versions)

- Enclosure should be mounted adjacent the Fire Alarm Control Panel (FACP).

- Enclosure should be positioned in an accessible place agreed with the end user.

- Enclosures should be mounted on a dry, clean, flat surface and in a level position such that the enclosure is not distorted.

- Screws or bolts of 5mm diameter and suitable wall fixings must be used to mount the enclosure using all mounting holes.

- This enclosure should not be mounted in another enclosure or near sources of excessive heat.

- Cables should be connected using suitable metal cable glands fitted to the knock-outs provided. If additional cable entry points are required, all debris caused by drilling of additional cable entries must be cleared before power is applied to the module.

- The equipment is of Class1 construction so must be permanently and reliably connected to the fixed earth of the installation.

- The primary earth of the end use application must be permanently marked with the protective earth symbol (IEC415 No. 5017). A suitable primary disconnecting device must be provided in the end use application.

- Battery and load connections must be considered for connection to SELV (safety extra low voltage) circuits only.

- The maximum leakage current of the completed and installed equipment must not exceed 3.5mA.

Enclosure Fixing Centres

The following diagrams show enclosure fixing centres.

Diagrams show the chassis and associated components removed.

Verify enclosure type prior to commencing works.
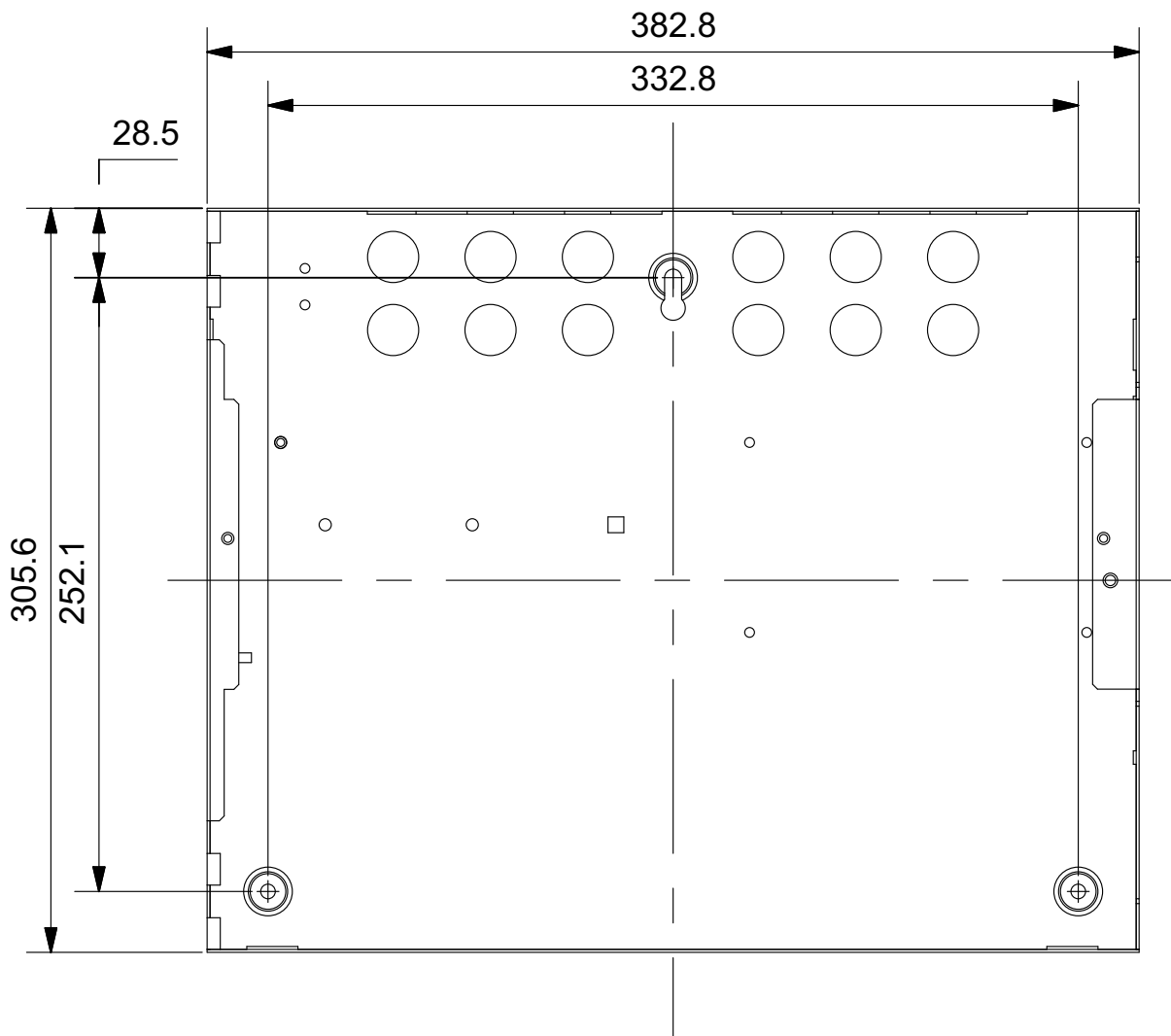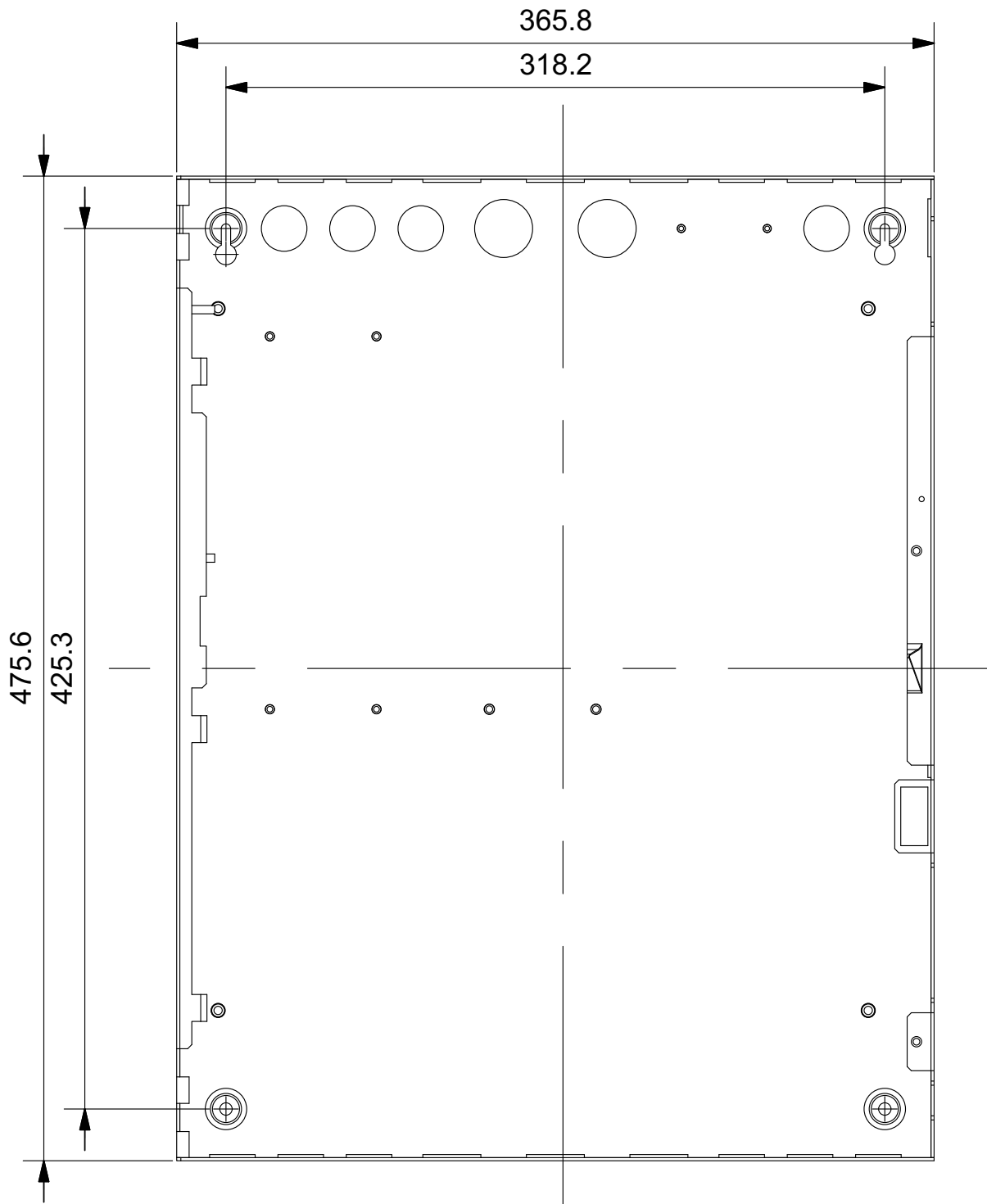
Figure 3-1
Vizulinx 'M2' housed module fixing centres

Figure 3-2
**Vizulinx 'AM3' housed modules fixing centres**

Taktis Fire Alarm Control Panel Connection

- Taktis EN
- Taktis UL

Communication between a Vizulinx module and a Taktis fire alarm control panel is by Ethernet IP. This can be a direct connection or via an IP network, to provide IP connectivity in the Taktis panel a Media Gateway card must be installed in slot 'F' on the Taktis backboard as shown below.

Note: Ethernet cable must be straight through connection cable NOT a crossover connection.

Figure 3-3
**Inserting Media Gateway Card**
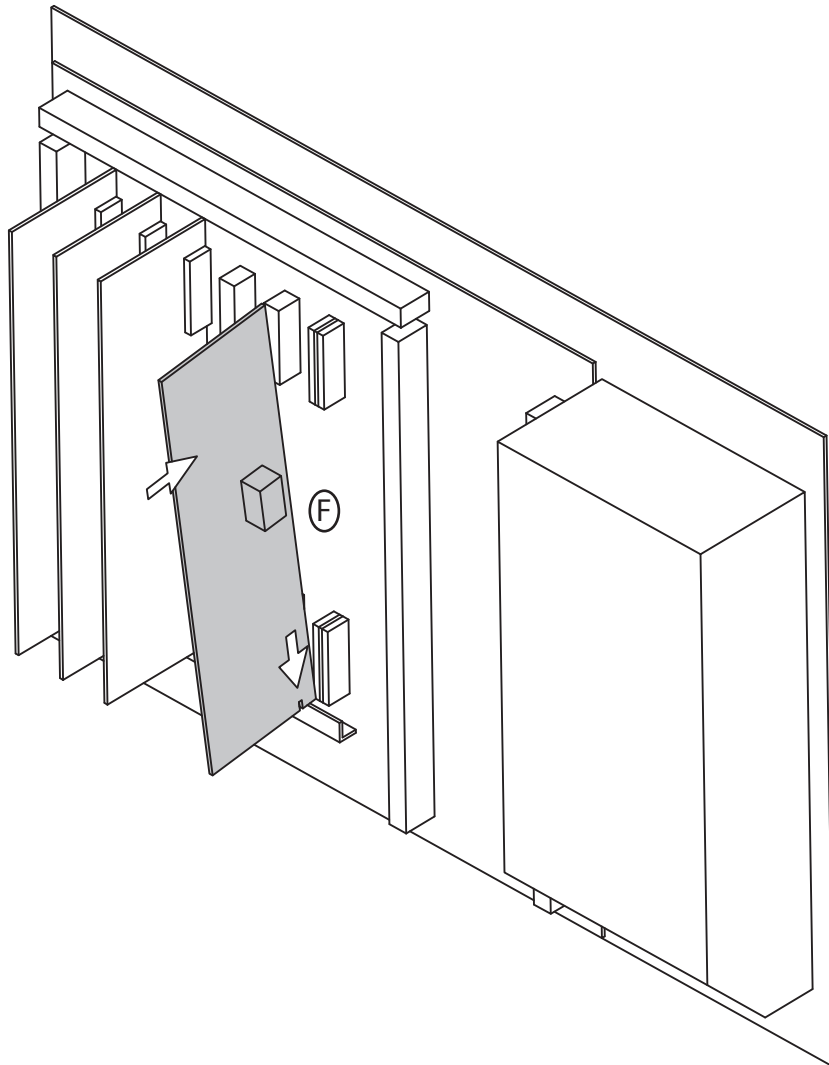
Direct Ethernet connection

This requires an Ethernet patch cable between the Ethernet socket on the panels media gateway card and the Ethernet 1 socket "BMS interface" on the Vizulinx unit.

The IP address of the media gateway card and the Vizulinx must be in the same range to be able to communicate, see the network configuration section of this manual on how to set the Vizulinx IP address.

Note: Ethernet cable must be a straight through connection cable NOT a crossover connection.

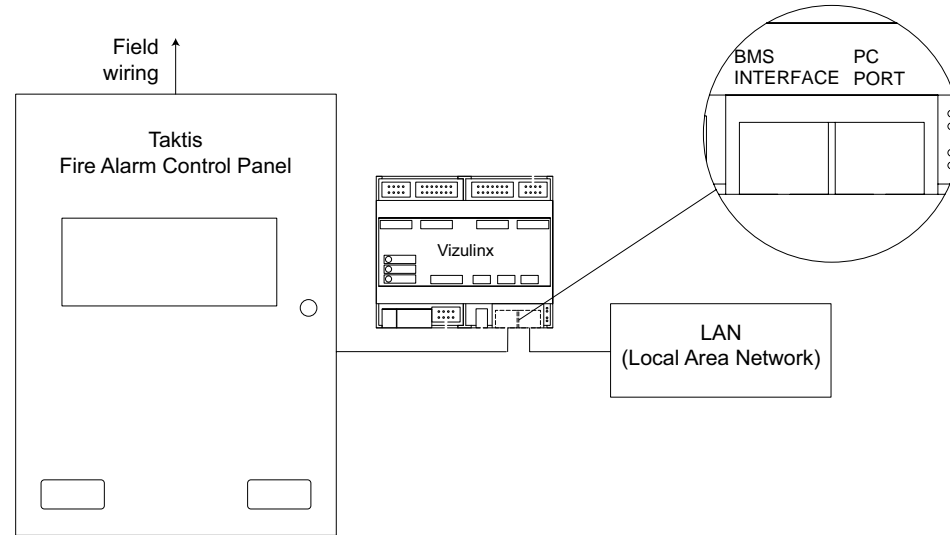**Figure 3-4**
Ethernet Connection
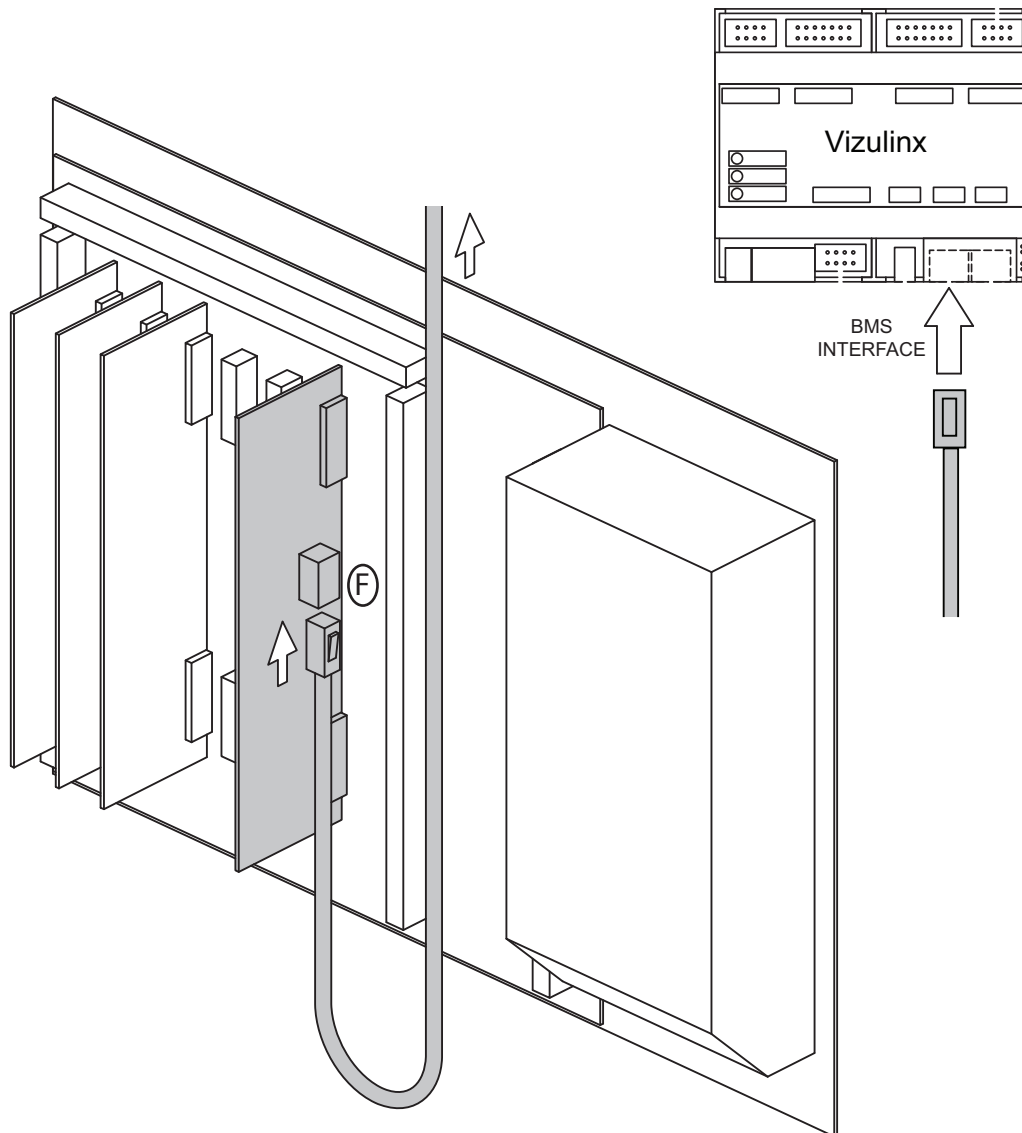
IP Network Connection

Connection between Taktis and Vizulinx can be done across a Local Area Network (LAN) if required. Ethernet cables will be required to connect the panel and the Vizulinx unit to the LAN. IP addresses of the panel and the Vizulinx must be set so the first 4 numbers match the network and the fourth number is the unique address for that device on the network.
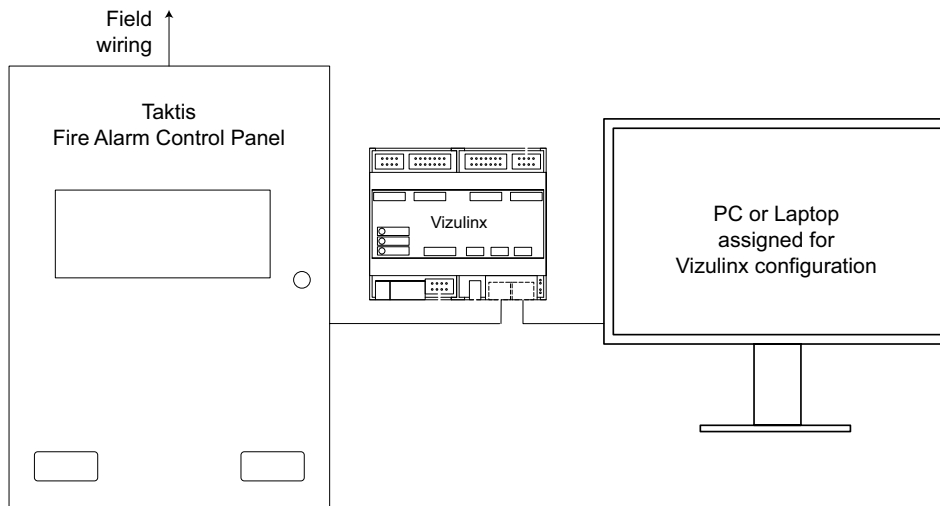
Note: Ethernet cable must be a straight through connection cable NOT a crossover connection.

Figure 3-5
Taktis LAN Configuration

Diagrams not to scale.

Figure 3-6
Taktis Panel PC Configuration

Diagrams not to scale.

## Syncro/Elite Fire Alarm Control Panel Connection

- Syncro/Syncro AS
- Elite/Elite RS

Vizulinx connection to these panels is by way of an RS232 serial communication link to the panels PC port. A 10 way ribbon cable is provided with an IDC connector at one end and 3 ferruled connections at the other end.

The IDC connector plugs into the control panels PC port and the ferruled connections are terminated in the "FIRE PANEL RS232" connection, the connections must be terminated as shown in Figure 3-7.
=
Figure 3-7
RS232 to PC port interface cable connections

RS232 Connection
To Vizulinx

Connection to
Control Panel PC port
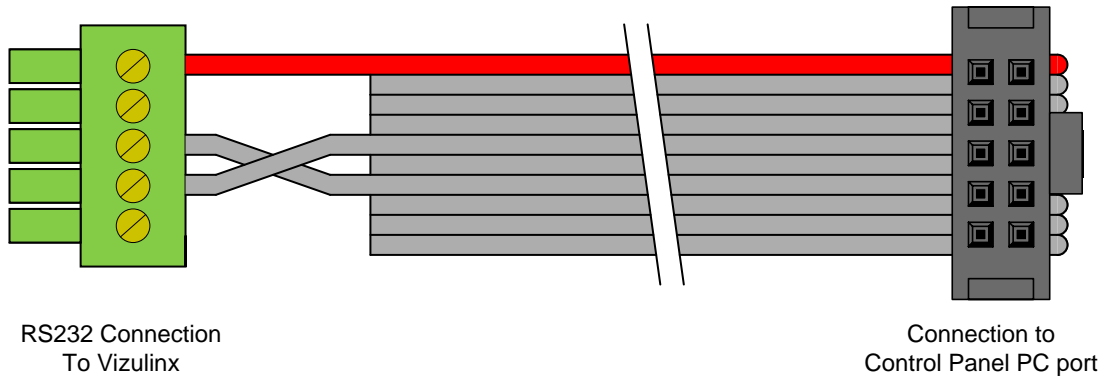
Power Supply Fault Monitoring Connection

- Supplied with all versions
- Note: Factory wired in housed versions

The power supply fault monitoring ribbon cable is connected to the normally open and common connections on the power supply.

Where the unit is supplied as module only, the cable can be used to work with normally open/common monitoring contacts found on other power supply units.

Figure 3-8
Power supply fault monitoring ribbon cable

Common/normally open
connections
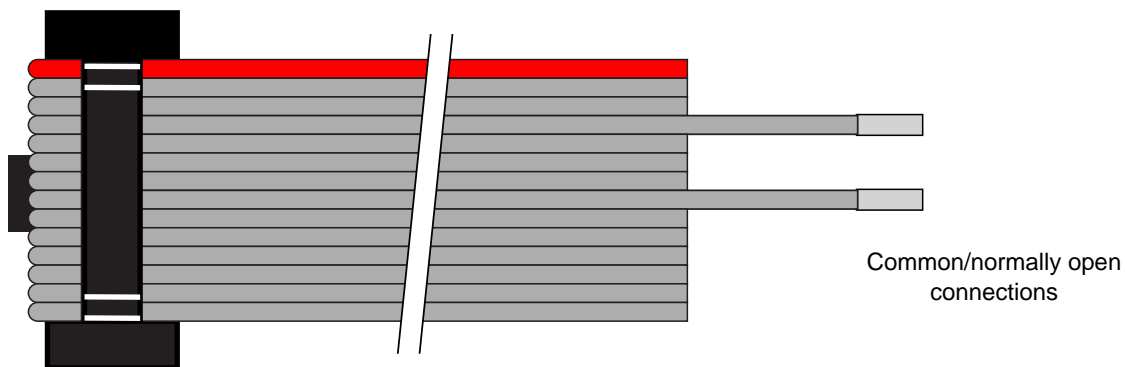
## Conventional & Extinguishant Control Panel Connection

- Sigma CP (2,4 & 8 zone) conventional panels
- Sigma XT 3 zone, single area extinguishant control panel
- Sigma CP-A (2,4 & 8 zone) conventional panels (UL)
- Sigma A-XT 3 zone, single area extinguishant control panel (UL)
- Sigma XT+ multi area conventional extinguishant panel EN

Vizulinx connects to the above listed panels using its General Purpose Input Outputs (GPIO). 16 GPIO pins are provided across 2 x IDC connectors which allow monitoring of switched outputs such as volt free relays or open collector outputs. GPIO pins as default are held high and must be activated by applying a 0v.

Selection of a panel from the above list, in the Vizulinx setup wizard, will allocate a default monitoring status and ID to each of the GPIO pins. Two multi-coloured ribbon cables are provided to be able to connect the relevant status outputs of the panel and ancillary boards (if used). The below table details which colour core of the ribbon cable should be connected to which status output to match the default GPIO pin ID.

The black core of each ribbon cable is connected to 0v on the Vizulinx module, this must be linked to the common terminal of each status output on the control panel and ancillary board as shown in Figures 3-5, 3-6 and 3-7.

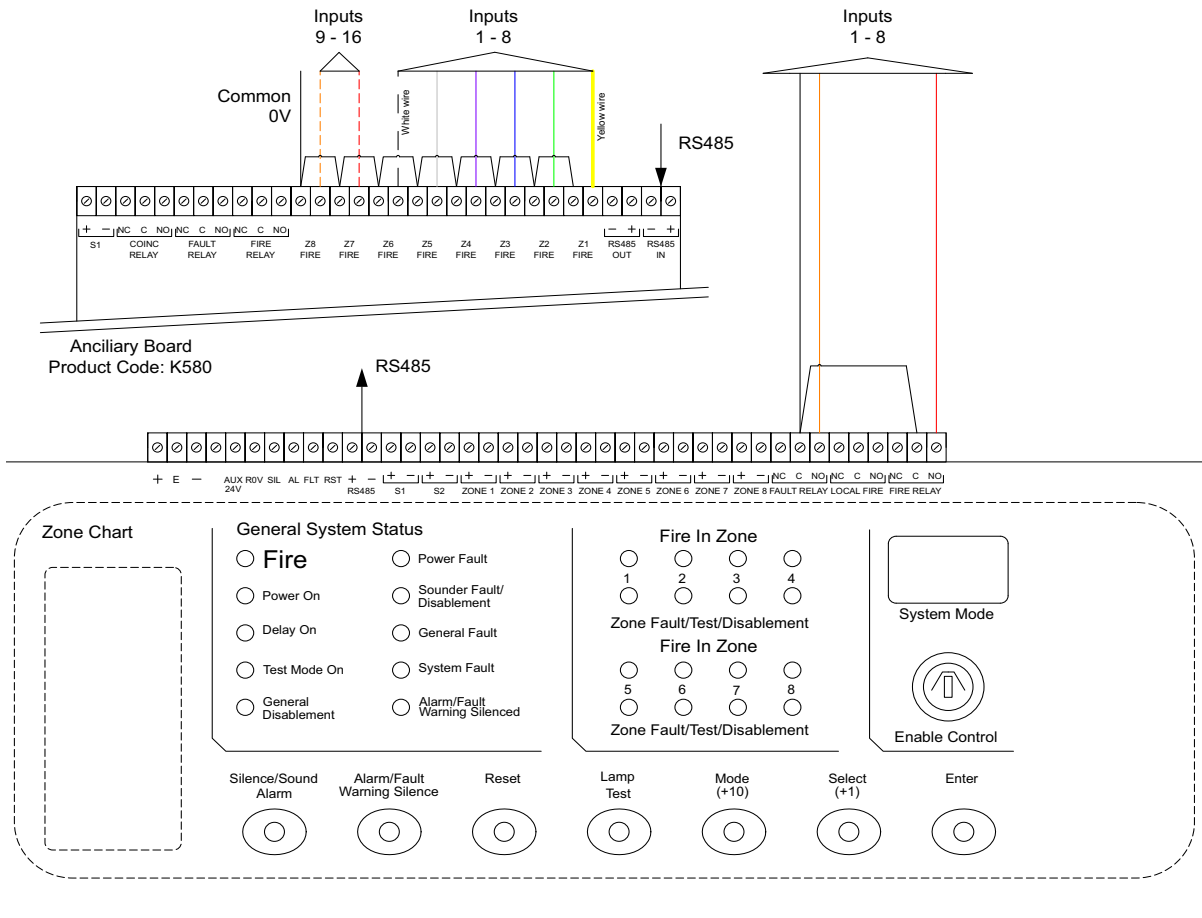**Figure 3-9**
Input (GPIO interface) to panel cable

Connection to Vizulinx inputs

Connections to panel terminals
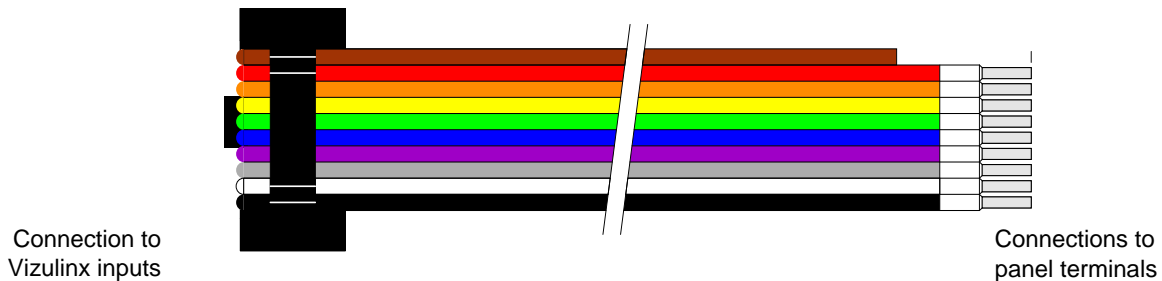
The table below shows default functions for inputs:

| Wire Colour	GPIO Input	Default Settings	Sigma CP/ A-CP (Up to 8 Zones plus ancillary card)	Sigma XT/ A-XT (Plus ancillary card)	Sigma XT+ (Up to 8 zones, 4 area)
			Inputs 1 -8		
Red	1	Fire	Fire	Fire	Fire
Orange	2	Fault	Fault	Fault	Fault
Yellow	3	Not Used	Zone 1 Fire	1st Stage	Zone 1 Fire
Green	4	Not Used	Zone 2 Fire	2nd Stage	Zone 2 Fire
Blue	5	Not Used	Zone 3 Fire	Zone 1 Fire	Zone 3 Fire
Violet	6	Not Used	Zone 4 Fire	Zone 2 Fire	Zone 4 Fire
Grey	7	Not Used	Zone 5 Fire	Zone 3 Fire	Zone 5 Fire
White	8	Not Used	Zone 6 Fire	Manual Mode	Zone 6 Fire
Black	Common (0V)				

Wire Colour	GPIO Input	Default Settings	Sigma CP/ A-CP (Up to 8 Zones plus ancillary card)	Sigma XT/ A-XT (Plus ancillary card)	Sigma XT+ (Up to 8 zones, 4 area)
Inputs 9 -16					
Red	9	Not Used	Zone 7 Fire	Extinguishant Disabled	Zone 7 Fire
Orange	10	Not Used	Zone 8 Fire	Gas Released	Zone 8 Fire
Yellow	11	Not Used	Coincidence mode	Activated	Area 1 2nd Stage
Green	12	Not Used	Not Used	Hold off operated	Area 2 2nd Stage
Blue	13	Not Used	Not Used	Extract Fan Started	Area 3 2nd Stage
Violet	14	Not Used	Not Used	Manual Release Operated	Area 4 2nd Stage
Grey	15	Not Used	Not Used	Not Used	Not Used
White	16	Not Used	Not Used	Not Used	Not Used
Black	Common (0V)				

Connection Diagrams

Figure 3-10
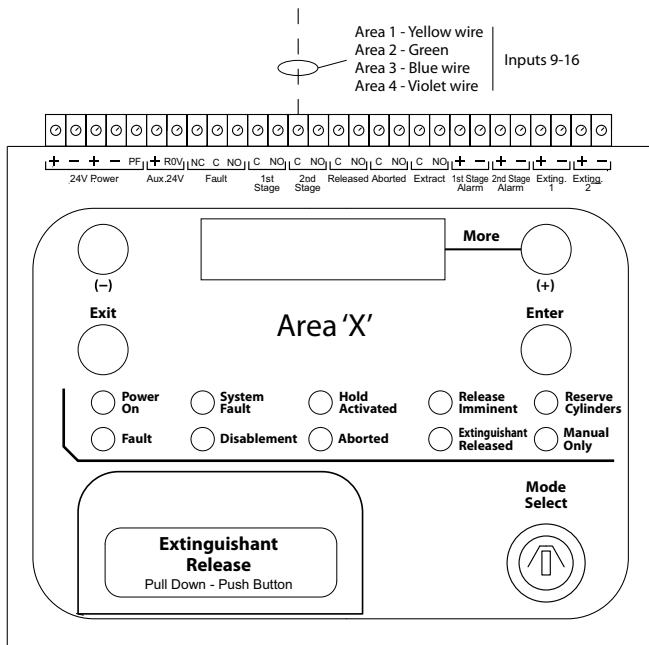**Typical default Sigma CP/CP-A connections**

Figure 3-11
Typical default Sigma XT connections
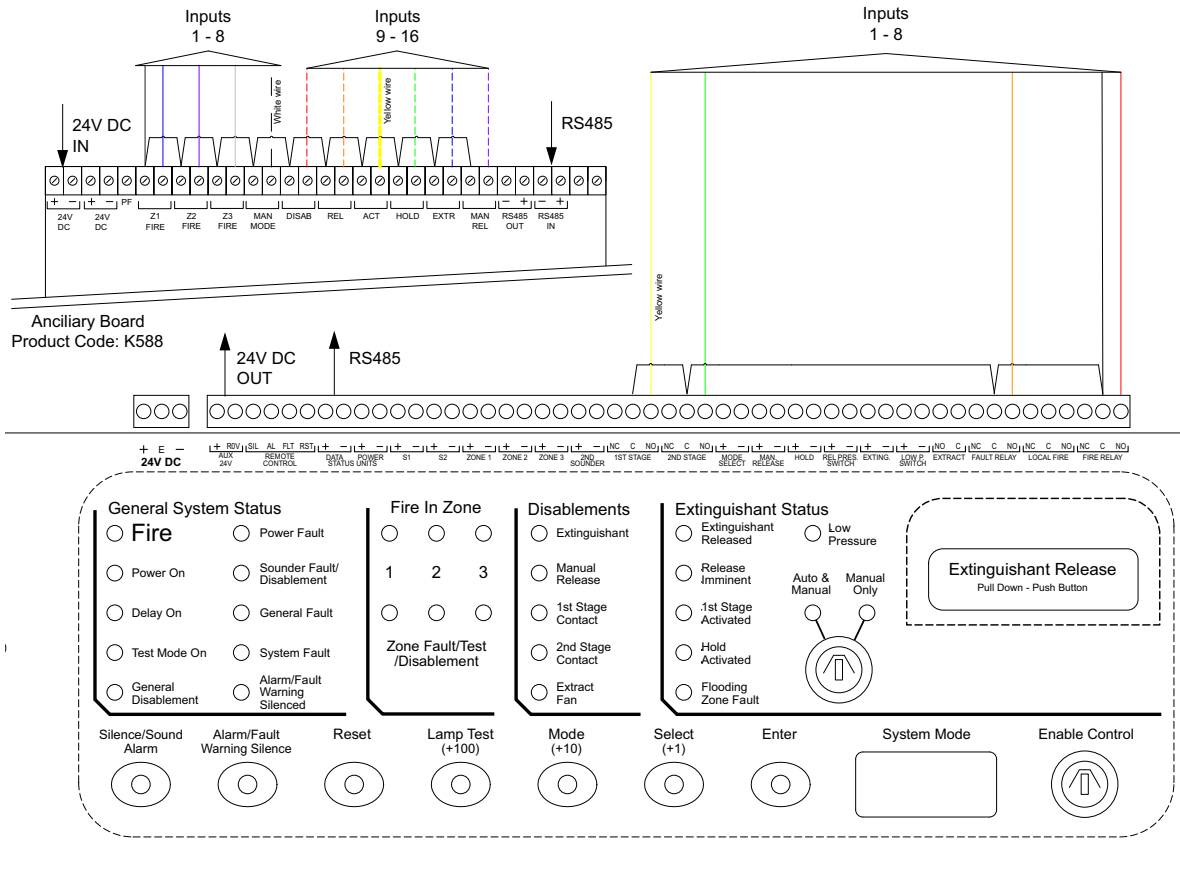
Figure 3-12
Sigma XT+ connections

Refer to Figure 3-5 and the following:

GSM & Wi-Fi Connectivity

Connection of a Vizulinx module to a GSM or Wi-Fi network requires the addition of a USB dongle with a sim card which is inserted into the USB slot on the module.

Depending on the type of dongle used the unit will provide GSM only or it can provide GSM and Wi-Fi.

GSM Only

GSM only enables the Vizulinx to send notification messages via text using the mobile network.
This requires a specific USB dongle type, either Huawei E1750 – Stick mode or Huawei E3372S – Stick mode.

GSM & Wi-Fi

GSM & Wi-Fi enables the Vizulinx to connect to the GSM network to provide notification messages by text, while also using the GSM network to connect to the internet enabling the sending of e-mail notifications.
The following recommended range of Huawei Hi-Link USB dongles can be used to provide SMS an Internet connectivity via GSM:

E3372h, E5331, E5332, E5372, E5375, E5756, E589, E5730, E5776, EC5321, EC315, E5220, E5221, E5251, E5151, E355, E8231, E8278, E5186, E5170, E5377, E5786, E5573, EC5321, EC5377U, E5770, E5771, E5785, E5787, E5573, HW-02G, HW-01F, HW-02E, E8372, 401HW, 506HW, HWD34, KD02, KD04, WS318, WSR20, WS331, WS330, WS880, WS326, WS328, WS860

See Configuration section of this manual for instructions on how to set-up GSM and Wi-Fi requirements.

Figure 3-13
Typical Vizulinx System Diagram
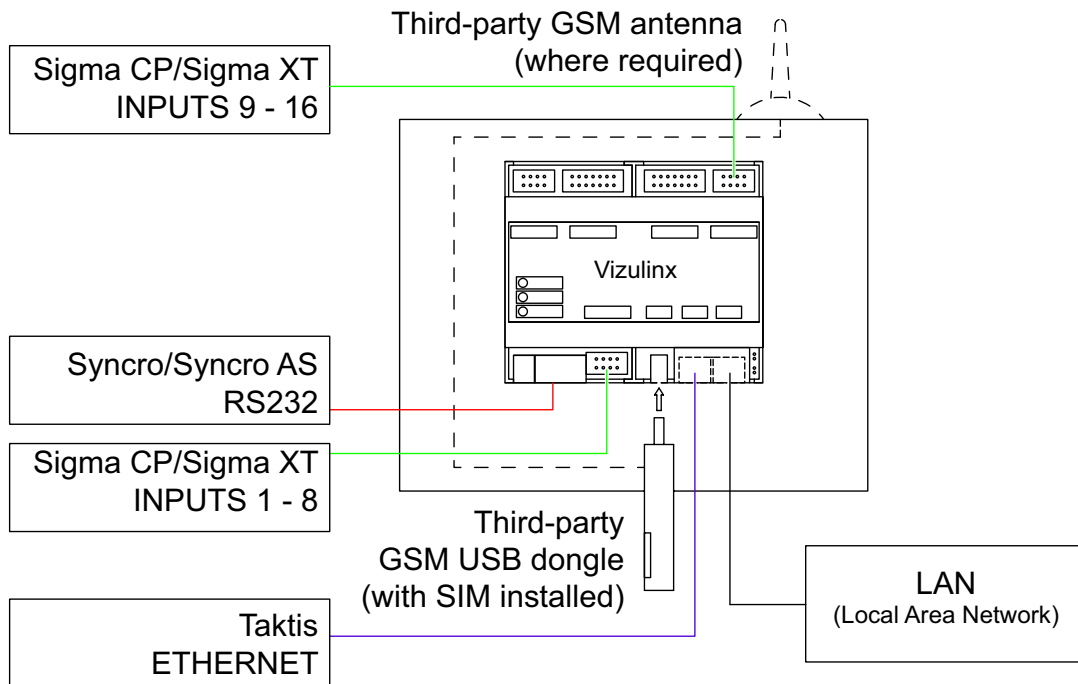
Important!! Syncro and Elite panels which connect to the Vizulinx using the RS232 port cannot be connected at the same time as a Taktis which uses the Ethernet 0 (BMS interface) port.

Conventional and extinguishing control panels connected to the Vizulinx GPIO can be connected alongside either a Syncro/Elite or Taktis type panels.

Section 4
Configuration

This section covers setup connection and configuration of the Vizulinx module.

Getting Started

1. Connect the Vizulinx module to the fire alarm system.

2. Power up Vizulinx (allow 15 seconds to boot).

3. Set your configuration PC static IP address to: 192.168.100.90
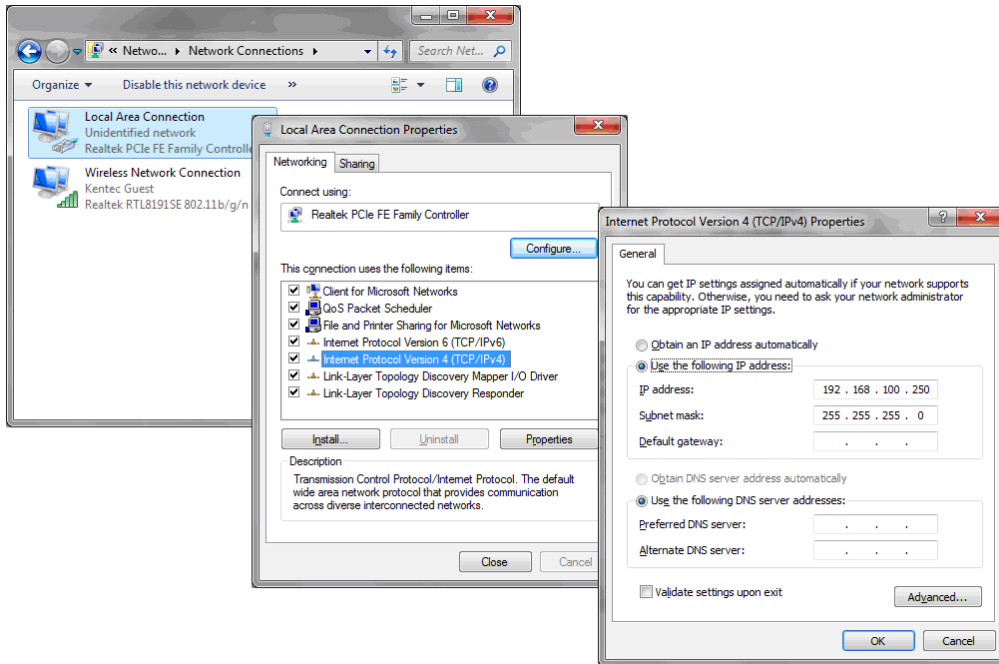
4. Open the internet browser on the configuration PC and enter the following address into the address bar:
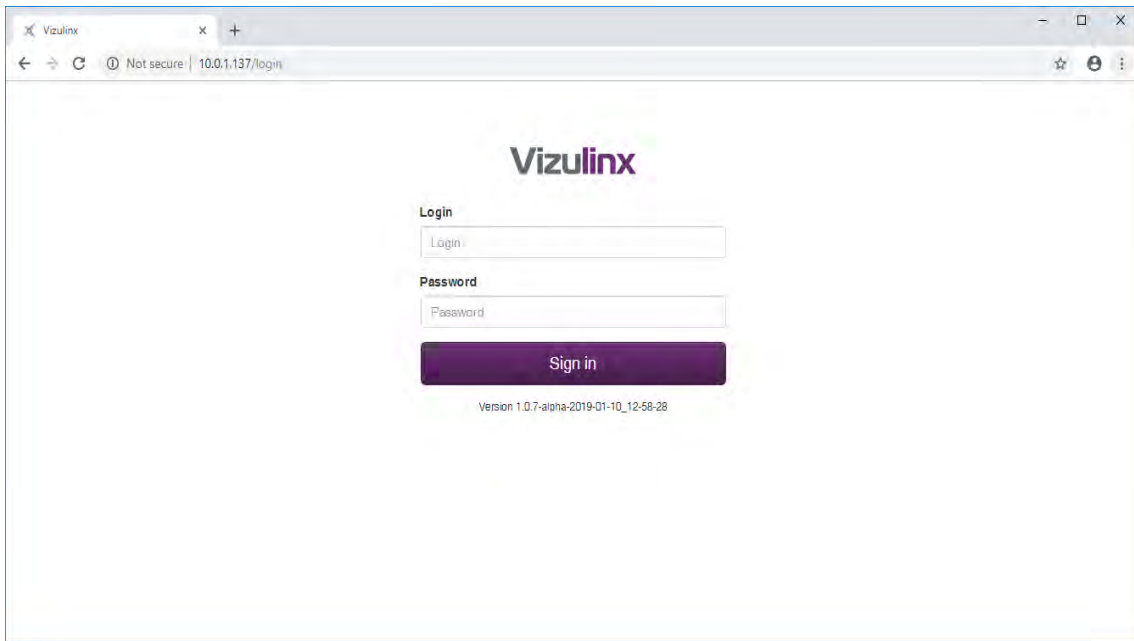   http://192.168.100.250

    Important: This system is not compatible with Microsoft Edge browsers. Google Chrome is the recommended browser.

5. On the Vizulinx sign in screen enter the Login ID and password. The default settings are:

Login: admin
Password: password

Note: Refer to the Settings section of this document for details on how to change login and password details.

EZ Configuration

The Vizulinx on first ever power up has no default configuration, once logged in the Vizulinx event screen is displayed with the option "EZ Configuration" The Vizulinx will be non-functional until the system has been configured.
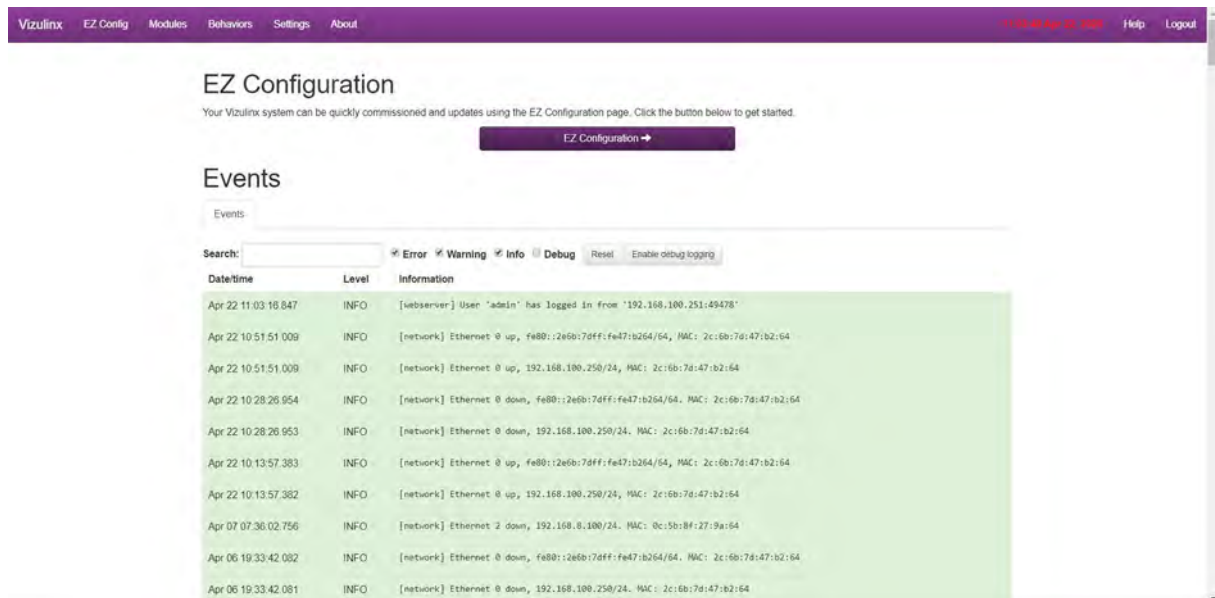
EZ configuration provides a quick and simple setup process for the Vizulinx module. Click on the "EZ Configuration" button to start the setup process: The EZ configuration is a step by step guided process to setting up the Vizulinx for the required configuration.

Step 1 - Site/Location name

Enter a site or location name to be able to identify the Vizulinx, this will appear in the header text of e-mails and can be shown in SMS text messages. This is important when receiving messages from multiple Vizulinx sites.
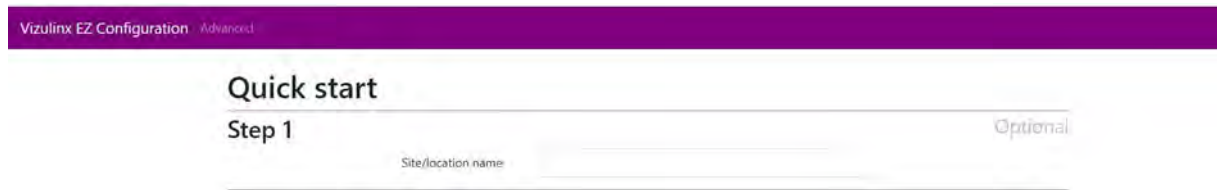
Step 2 – Panel selection

Vizulinx can be used with the full range of Kentec fire alarm and extinguishing control panels as shown on the screen.

Select the panel type required by clicking on the icon. Depending on the panel selected further information may be required.

Common Fire and Fault

This selection can be used to monitor fire and fault from any fire alarm control panel. Selection of this panel option configures GPIO A inputs 1 and 2 as fire and fault inputs, respectively. The configured Vizulinx behaviours will trigger on activation of the inputs.

Sigma CP/A-CP, Sigma XT/A-XT and Sigma XT+

There is no configuration required for the conventional fire alarm panels when selected, the default allocation of GPIO to support connection of conventional panels will be done automatically. The screen will just display the panel selected with a short description as shown in the example below.

The default GPIO settings applied by this selection can be modified if required, see GPIO ports section of this manual.

Syncro AS, Syncro, Elite, Elite RS and Hydrosense

These panel options require little configuration once selected, however if planning to use Modbus the panel/loop mapping of the Modbus addresses can be configured here:

Modbus Panel/Loop Mapping

The mapping of Modbus addresses to panel and loops can also be done at this stage, click on edit mapping and the following window will appear:

The Vizulinx is provided with a standard number of Modbus addresses as shown, addresses 1001 to 2000 are allocated to loops – 250 addresses per loop.
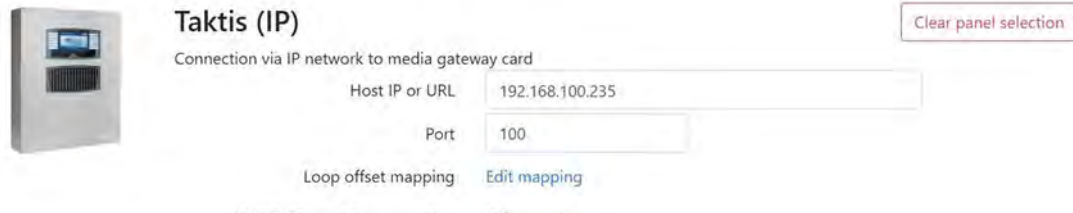
Enter the panel number and loop number to allocate each block of 250 addresses.

For full details on Modbus mapping and configuration, refer to the Modbus section of this manual.

Taktis (IP) and Taktis UL (IP)
Taktis panels communicate with Vizulinx using IP connectivity therefore when selecting a Taktis IP connection data will be required as shown below:

Host IP or URL
This is the IP address of the Media Gateway Card installed within the Taktis panel connected to the Vizulinx module.

IP address of the Taktis panel can be obtained through its Access level 3 – Edit Configuration menu. To access the information, enter the level 3 password and press the following keys on the display –
User Controls> Configuration> Edit Configuration> Panel Modules> Configure Media Gateway> LAN

Port
This is the Port number associated with the Comms; The Port number should match that in the panels Media Gateway Card settings. Port number of the Taktis panel can be obtained from its Access Level 3 – Edit Configuration menu. To access the settings, enter the Access Level 3 password and press the following keys on the display – User Controls> Configuration> Edit Configuration > Panel Modules> Configure Media Gateway> LAN

Note: To establish connection between Vizulinx and the Taktis panel the IP address of the Vizulinx will need to be configured to be in the same range as the panels IP address, see Network section of this manual.

Loop Offset Mapping
If loop offsets are being used across a Taktis network then it is important to map these in Vizulinx so that Loop data in the messaging matches the network.

Click on Edit mapping and the following screen will appear:

Click on add and enter the panel number and the ID number of the first loop in the panel based on the offset. For each additional panel on the Taktis network click add and enter the data. It is not necessary to enter panel as there will be no offset this will always start with loop.

The example in the screen shot above is for a three panel network:

Panel 1- 6 loops Numbered 1-6
Panel 2 –10 loopsNumbered 7-16
Panel 3 – 4 loopsNumber 17 – 20

MODBUS Panel/Loop Mapping
The mapping of Modbus addresses to panel and loops can also be done at this stage, click on Edit mapping and the following window will appear:

The Vizulinx is provided with a standard number of Modbus addresses as shown, addresses 1001 to 2000 are allocated to loops – 250 addresses per loop.

Enter the panel number and loop number to allocate each block of 250 addresses.
For full details on Modbus mapping and configuration, refer to the Modbus section of this manual.

Step 3 – Messaging/Integrations

Vizulinx can provide SMS and E-mail messaging using different methods as well as system integration through Modbus or BACnet. This step enables you to select the communication method or integration required for your system.

Note: Multiple messaging and integrations can be set-up simultaneously on the same system however messaging and integration methods which use the same ports cannot be run simultaneously the following options cannot be run simultaneously: Modbus and BACnet, USB GSM SMS stick mode and USB GSM SMS/Data Hi-Link, E-mail SMTP and Zero config e-mail.

E-mail SMTP

This option enables the Vizulinx unit to send e-mail messages using Simple Mail Transfer Protocol, to enable connection to the SMTP server the following information is required:

Send alarms/faults to e-mail

If an alarm or fault is activated on the Fire Panel, Vizulinx can send an e-mail message via the SMT server containing the alarm/fault information to a programmed e-mail address. To add an e-mail address,click "edit" and then "Add", enter the e-mail address in the box:

Enter additional e-mail addresses by clicking on "Add". There are no limits to the number of e-mail addresses that can be entered. Additional e-mail addresses can still be added to this feature after the EZ configuration is complete.

Host server URL
This is the URL of the e-mail server.
Port
The TCP port used to communicate with the server.
Login
Login ID required to access the e-mail server.
Password
Password corresponding to the Login ID required to access the mail server.
From
This is an e-mail address which identifies to the recipient where the e-mail has come from.

Once all information has been entered you can select another communication method by clicking on the "Select another messaging/integration" button. If you do not wish to select another communication/integration method click on the "Save changes" button to complete setup.

TextMagic (SMS)

This option enables the transmission of text messages via SMS (Simple Message Service) using the Text-Magic web service. To use this feature, you will require connection to a LAN network with internet access and a TextMagic account. To set-up a TextMagic account go to www.textmagic.com

To setup the TextMagic (SMS) enter the following information:

Send alarms/faults to mobile

If an alarm or fault is activated on the Fire Panel, Vizulinx can send an SMS message via the TextMagic service containing the alarm/fault information to a programmed mobile number. To add a mobile number, click "edit" and then "Add" enter the mobile number in the box:

Note: Telephone numbers must be entered using the country code e.g. +44.

Enter additional mobile numbers by clicking on "Add". There are no limits to the number of mobilenumbers that can be entered.

Additional e-mail addresses can still be added to this feature after the EZ configuration is complete.

Username

This is the username used to login to your text magic account.

API V2 Key

This is the alphanumeric code which securely links the Vizulinx to your Text Magic account. This is available from your TextMagic account.

Once all information has been entered you can select another communication method by clicking on the "Select an-other messaging/integration" button. If you do not wish to select another communication/integration method click on the "Save changes" button to complete setup.

USB GSM SMS Stick mode

This option enables the transmission of SMS text messages from Vizulinx via a USB GSM dongle modem. A suitable dongle modem fitted with a network SIM card installed can be plugged into the USB socket on the Vizulinx module. The following USB dongle modems are recommended for use with the Vizulinx module:

Huawei E1750
Huawei E165G
Huawei E3372S Stick mode

Important note!

It is advised to check the GSM network coverage before installing a Vizulinx with a USB GSM. Kentec will not take any liability for the reliability or performance related to the GSM network.

Only a single piece of information can be entered for this feature:

Signal level triggers
These are the levels associated with the GSM network signal strength and it is recommended that these should be left at default settings of:

Excellent -75, Good -85, OK -95, Marginal -120

Once the EZ config is complete the Vizulinx events screen will display an event for successful connection to the GSM network along with the current signal level. Events will also be shown whenchanges in the signal strength occur.

For details on how to register mobile phone numbers to receive text messages across GSM see the Distribution List section of this manual

Once all information has been entered you can select another communication method by clicking on the "Select another messaging/integration" button. If you do not wish to select another communication/integration method click on the "Save changes" button to complete setup.

USB GSM SMS/Data Hilink
This option supports the use of USB Wi-Fi dongles. A suitable wi-fi dongle with a network SIM card installed can be plugged into the USB socket on the Vizulinx module, this enables the Vizulinx to connect to the internet via GSM allowing Vizulinx to send SMS text messages and e-mail (using zero config e-mail option) without the need for a LAN connection.

The following USB Wi-Fi dongles are recommended for use with the Vizulinx module:
E3372, E5331, E5332, E5372, E5375, E5756, E589, E5730, E5776, EC5321, EC315, E5220, E5221, E5251, E5151, E355, E8231, E8278, E5186, E5170, E5377, E5786, E5573, EC5321, EC5377U, E5770, E5771, E5785, E5787, E5573, HW-02G, HW-01F, HW-02E, E8372, 401HW, 506HW, HWD34, KD02, KD04, WS318, WSR20, WS331, WS330, WS880, WS326, WS328, WS860

Important note!
It is advised to check the GSM network coverage before installing a Vizulinx with a USB GSM. Kentec will not take any liability for the reliability or performance related to the GSM network.

The network mode can be configured to determine the functionality of the Wi-Fi connectivity:

Disable internet access
This setting will prevent the USB Wi-Fi dongle from connecting to the internet and will operate thedongle in GSM SMS mode only allowing the sending of text messages but no e-mail.

Enable internet access
This setting connects the USB Wi-Fi dongle when there is no other alternative internet connection. It canprovide a level of redundancy for systems which use a LAN internet connection as primary internetaccess i.e. should the LAN connection the wi-fi dongle will takeover connection to the internet.

Make preferred internet interface
This setting will make the USB the primary connection to the internet allowing the sending of SMS text and Zero config e-mail messages.

Once all information has been entered you can select another communication method by clicking on the "Select another messaging/integration" button. If you do not wish to select another communication/integration method click on the "Save changes" button to complete setup.

Zero config email service
This option provides an e-mail service without the requirement of setting up a connection to an e-mail server, the feature uses an e-mail server pre-configured specific to Vizulinx. To use this feature the Vizulinx must have a connection to the internet via LAN or USB GSM Wi-Fi dongle.

E-mails will be sent from vizulinx.net it is important to ensure e-mails from this server are not blocked by the receiving e-mail server.

The only setup for this feature is to add any e-mail addresses you wish to send messages to:

Send alarms/faults to e-mail
If an alarm or fault is activated on the Fire Panel, Vizulinx can send an e-mail message via the SMTP server containing the alarm/fault information to a programmed e-mail address. To add an e-mail address, click "edit" and then "Add", enter the e-mail address in the box:
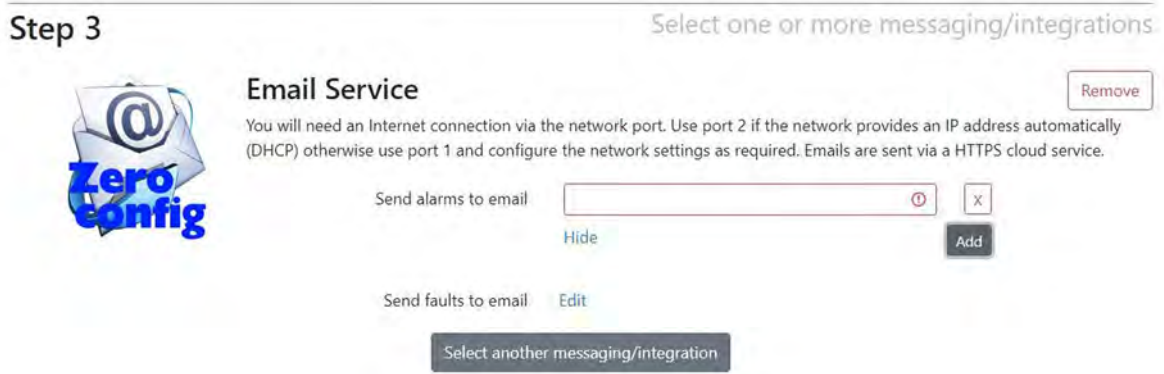
Enter additional e-mail addresses by clicking on "Add". There are no limits to the number of e-mailaddresses that can be entered.

Additional e-mail addresses can still be added to this feature after the EZ configuration is complete.
Once all information has been entered you can select another communication method by clicking on the "Select another messaging method" button. If you do not wish to select another communication method click on the "Save changes" button.

Modbus slave
This feature enables the transmission of status information from the fire alarm system to Modbus compatible equipment. The Vizulinx is a Modbus slave with a pre-configured address map, full Modbus information is provided in the Modbus section of this manual.

The only setup for this feature is to select the TCP Port used for Modbus communication:

TCP Port
This is the port for communication with Modbus and should be default 502.

Note: When using Syncro with Modbus the Syncro panel must be configured for a **Graphics System** - this is a tick box within the panel settings on the LE2 configuration software. This ensures Modbus registers are cleared automatically when alarm and fault statuses are cleared on the panel.

Once all information has been entered you can select another communication method by clicking on the "Select another messaging method" button. If you do not wish to select another communication method click on the "Save changes" button.

BACnet

Note: BACnet feature is only available when using a Taktis/Taktis UL control panel

This feature enables the transmission of status information from the fire alarm system to Modbus compatible equipment. Detailed information regarding BACnet is provided in the BACnet section of this manual

To setup the BACnet feature the following information needs to be entered:

Upload NLE or XML configuration file
BACnet requires the panel/network configuration to be able to allocate object ID's this is obtained from LE2 configuration software used with the Kentec range of addressable panels. Click on the browse window and select the required config file. When the config file has loaded the screen will show the number of panels/nodes, zones and devices as shown below:

The imported values should be checked against the configuration file to ensure they are accurate.

BACnet device ID
This is an ID number used to identify the Vizulinx module on a network. The default ID is 250101 however this can be changed should it conflict with any existing ID's on the BACnet system. To change click on the box and type in the new ID number or use the up and down arrows to scroll.

Broadcast IP
This is the IP address the Vizulinx unit uses to transmit information this should be set as required for the BACnet system.

Broadcast unsolicited COV

Support is provided for solicited and unsolicited COV (Change of Value) controlled by the tick box as shown in the screenshot above. Solicited (subscribed) COV – Vizulinx must send a subscribe request and wait for a response from the BACnet server before it can send its changes of value. Unsolicited or Unsunbscribed COV means the Vizulinx can send all changes of value without the need for a subscribe request to the BACnet server. Tick or un-tick the box as required.

Note: It is possible to upload an updated panel/network config file at any time.

Once all information has been entered you can select another communication method by clicking on the "Select another messaging method" button. If you do not wish to select another communication method click on the "Save changes" button.

Completion of EZ configuration

Once EZ configuration is complete i.e. changes have been saved, Vizulinx will return you to the main "Vizulinx" events screen. The EZ configuration is a starting setup and features can be modified, added to or deleted as required using Modules. The Modules and their configuration are addressed in the modules section of this manual.

Modifications to EZ configuration

On the Vizulinx main events screen there is a header option at the top of the screen which says "EZ configuration" clicking on this option opens a screen which allows you to easily modify some of the basic EZ configuration settings i.e. adding additional e-mail addresses, phone numbers etc.

This allows simple modifications to the configuration to be made quickly and easily.

Vizulinx (Events screen)

The Vizulinx events screen is the main screen and it displays information on system status and active events. It will also indicate errors in functionality that can assist with diagnostics.

The Vizulinx screen layout is shown below with descriptions for the important highlighted sections:
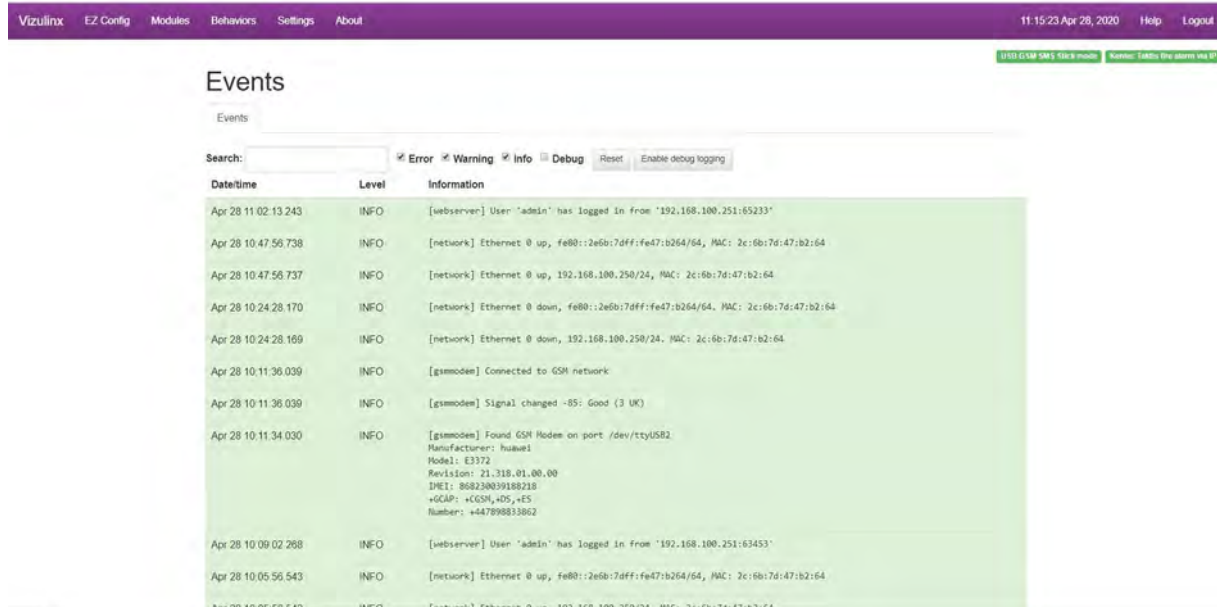
Time and date
On first connection to Vizulinx the time and date will be taken from the browser and will appear in red. Hold the mouse cursor over the time and date and a message will appear "System date/time – Click to set to browser time", click and the time and date will be set and turns white as confirmation. Clicking on the time and date at anytime will set it to the browser time and date.

Help
Opens the help menu in a new browser tab. The help menu provides guidance on all and information on all of the features and settings of Vizulinx as shown below:
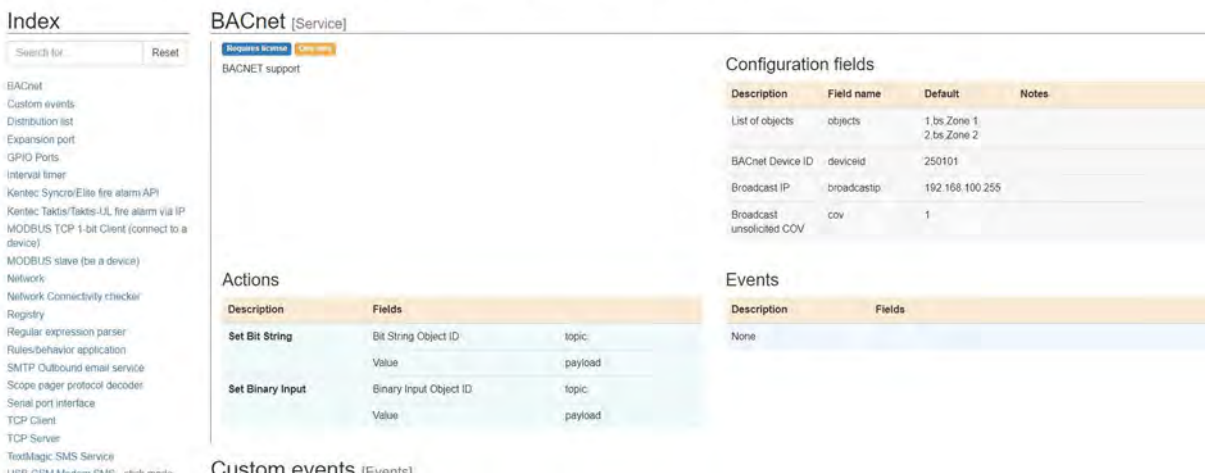
Logout
Logs the user out of the Vizulinx web browser. Users should logout before disconnecting PC or laptop

Connection Status

The status of various connections is shown by a coloured icon in the top right of the screen as shown above. Connections to the panel and GSM network will be displayed.If the Vizulinx has been configured to monitor connection to the internet (see Network Connectivity Checker in Modules section) the status of this connection will also be displayed. If the icon is green then the connection status is good, if the icon is red there is no connection.

Vizulinx

Clicking on the Vizulinx option on the menu header bar will return the display to the Vizulinx events screen.

EZ config

The EZ config option allows access to modify settings that were configured during the EZ configuration process, such as adding more e-mail addresses, mobile numbers etc. The options visible in this window will depend on the options selected during the EZ configuration process. An example of the EZ config window is shown below, a separate tab is provided for each of the configured features.

For details on the configuration settings view the relevant modules section of this manual.

To return to the main Vizulinx events screen click on "Advanced" on the menu header bar.

Modules

Features and functions within the Vizulinx are created using modules. A module will configure the necessary system settings within Vizulinx to run the feature or function i.e. selection of the Modbus module will setup the necessary system settings for the Modbus interface. It is recommended that the Vizulinx should initially be configured using the EZ configuration process which will automatically install and configure the required modules based on the selections made. The modules screen allows the user to customise the modules installed, add additional modules or remove modules as required. Details on the modules and the configuration settings are provided in the modules section of this manual.

Behaviours

The behaviours screen allows the user to customise the cause and effect associatedwith their system i.e. A fire condition from the panel will send an e-mail to a designated e-mail address. Selections made during the EZ configuration process will automatically have default behaviours created based on the selections made. Through this screen users can modify/customise the default behaviours, add new custom behaviours and delete existing behaviours as required. Details on configuring behaviours can be found in the behaviours section of the manual.

Settings

This screen provides access to system settings relating to licensing, diagnostics etc. For full details on the settings screen see the settings section of this manual.

Events

The central panel of the Vizulinx main screen displays events that occur on the system. Any event that occurs on the Vizulinx system is shown here typical events are:

- Events received from fire alarm panel/network i.e. fire and fault indications
- Confirmation of messages sent i.e. e-mails and texts
- Confirmation of network connections
- Module events – start/creating of modules
- Detailed error messages
- BACnet messages out
- Modbus messages out

Filtering can be carried out regards what events are shown this is controlled by the tick boxes at the top of the events panel i.e. Errors, Warnings and Info.

Debug

A diagnostic tool that allows raw debug data to be captured as shown in the screen-shot below, this is important diagnostic that can be interpreted by the Vizulinx developer. The debug option is disabled as default as it will cause the event screen to fill up very quickly. If users experience an issue that they cannot resolve, they can enable the debug function and repeat the steps that lead to the issue so the debug info can be collected. The debug option can be disabled once the information is collected.

The event log and the debug information is saved in Vizulinx and can be downloaded as part of a diagnostic report, see the settings section of this manual for details on how to download a diagnostic report.

Section 5
Modules

Recommendations are to configure the Vizulinx using the EZ configuration which will automatically install and setup the relevant modules as well as create default configurations. It is possible to add extra modules, remove modules and configure selected modules at any time through the "Modules" screen.

This section details the functions of each available module and their configuration settings. The modules screen is accessed by clicking on the "Modules" tab in the menu header bar on the Vizulinx main screen.

Modules are listed under category groups and can be a physical device such as a Control Panel, a service such as SMS text messaging or an Application such as a rule or behaviour. The screen shot shows an example of the modules screen for a Taktis system configured for SMS via USB GSM stick mode.
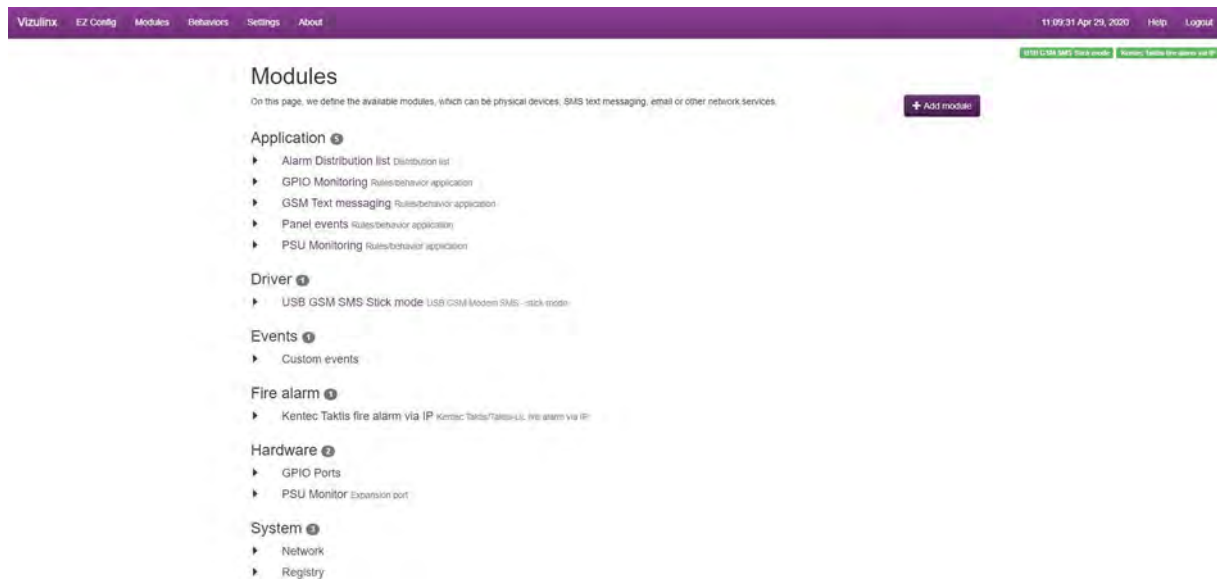
Clicking the relevant module will show the current configuration in the top right corner of the "Modules" screen along with a "Configuration" button which opens the configuration screen for the module.
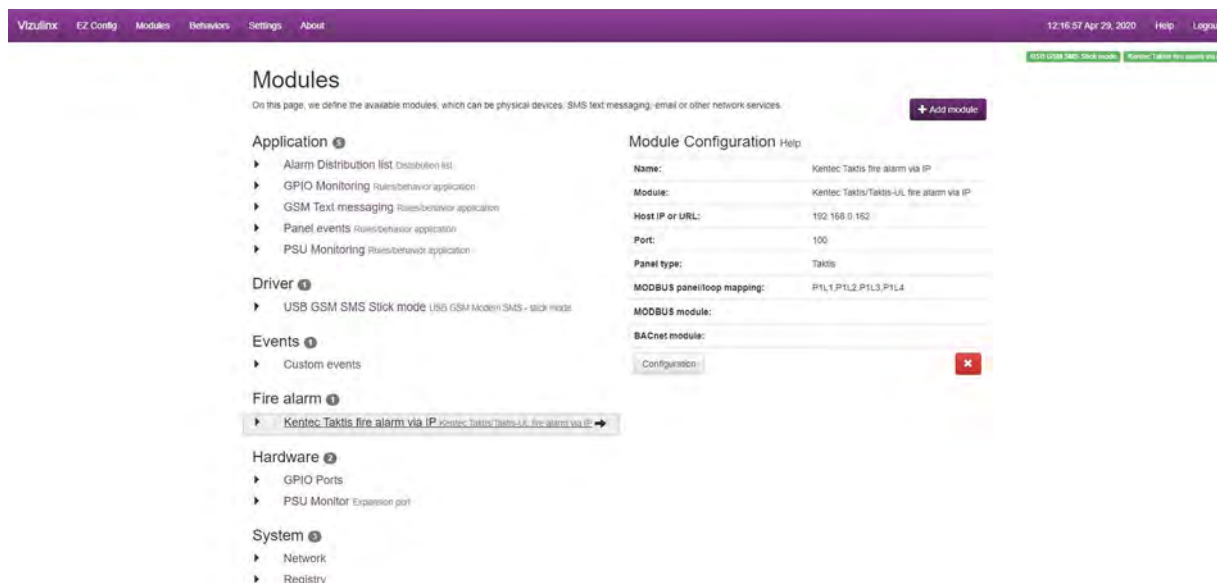
Modules can be removed by clicking on the red cross in the configuration settings area.

Modules can be added by clicking on the "Add module" button which opens another showing the available modules:
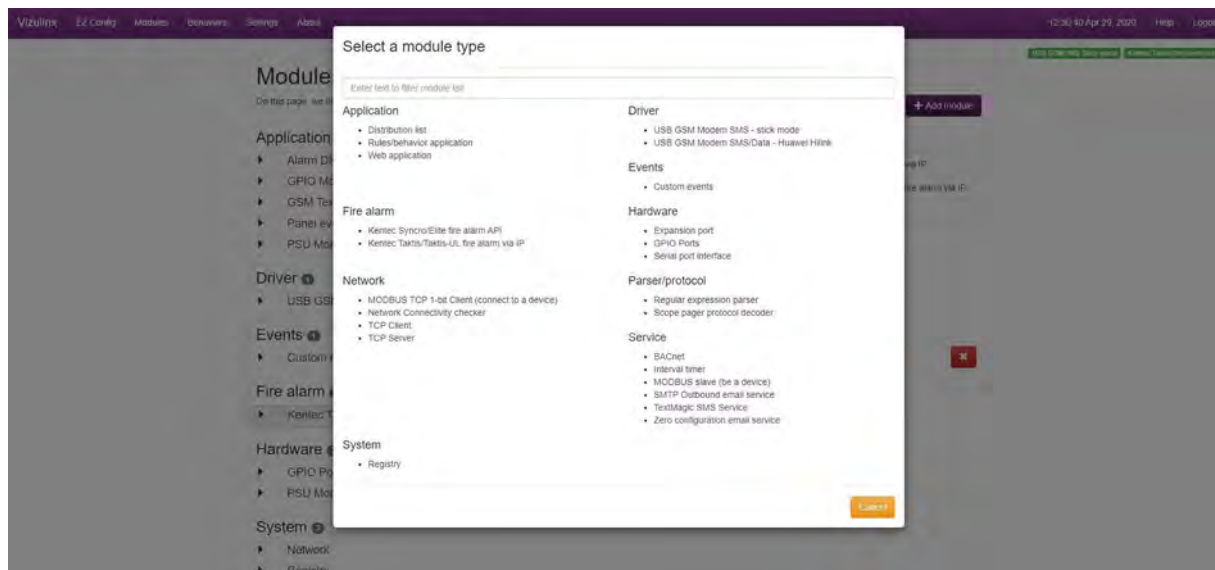
Available modules are sorted into groups to make them easy to identify this section details the modules associated with each group and the configuration settings.

Application

Modules in this group mainly relate to the control of rules/behaviours to provide our cause and effect actions associated with various options GPIO, Panel events, e-mail and SMS messaging. Each module has configuration options associated with them:

E-mail - Application that controls the activation of e-mail messaging associated with the configured rules/behaviours.

GPIO Monitoring - Application that controls the activation of rules and behaviours associated with the monitoring of GPIO inputs.

GSM Text messaging - Application that controls the activation text messages via GSM associated with the configured rules/behaviours.

Modbus PSU - Application that controls the activation of Modbus signalling relating to monitoring of the Vizulinx used to monitor the PSU. Vizulinx can monitor its power supply using a dedicated General Purpose Input.

Modbus GPIO - Application that controls activation of Modbus signalling relating to the GPIO (General Purpose Inputs & Outputs). Vizulinx has 16 GPIO's that can be used to monitor or activate other equipment.

Panel events - Application that controls the activation of rules/behaviours associated with panel events.

PSU Monitoring - Application that controls the activation of rules/behaviours associated with PSU monitoring. Vizulinx can monitor its power supply using a dedicated General Purpose Input.

SMS - Application that controls the activation text messages via SMS associated with the configured rules/behaviours.

Rules/Behaviours - Application that controls the activations of rules and behaviours which are not specifically allocated to any of the Applications i.e. e-mail, SMS etc.

The Applications listed previously are embedded App's that control the linking of features with rules/behaviours, limited config is available with these options. The configuration options with all the above Application modules are the same, click on any of the modules and the "Module configuration" will Appear in the top right corner of the screen the same three config settings will be listed for the Applications above – Name, Module, Debug logging:

Name: Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the "Configuration" button and typing a new name in the box.

Module: This is a description of the module type and cannot be changed.

Debug logging: As detailed in the Vizulinx events screen section of this manual, the Vizulinx can log debugging info relating to events etc. The debug logging in this configuration can filter what conditions are logged when debugging. Click on the "Configuration" button to open the config window, there is a drop down list associated with the "Debug logging" box allowing section of "Normal", "Filters", "Rules" and "Rules & Filters

Normal - Logs debugging data for the App only

Filters - Logs debugging data associated with filters configured for any behaviours linked to the App.

Rules - Logs debugging data associated with any behaviours relating to the App.

Rules & Filters - Logs debugging data associated with any behaviours and filters relating to the App.

The "Module configuration section of the screen also has a link to the help section relating to that function as well as a link that takes the user to the behaviours screen.

There are two other available Application modules "Distribution list" and "Web Application" these have multiple configuration options available as detailed in this next section:

Distribution List

The distribution list Application is associated with the text messaging functions. A distribution list is the log of mobile numbers to send text messages to when an event occurs on the panel. Behaviours can be created to send messages to the numbers in a distribution list when certain events occur i.e. alarms, faults etc.

When any of the text messaging functions (USB GSM stick mode, USB GSM HiLink or TextMagic) are selected in the EZ configuration a distribution list module will automatically be created but will have no mobile numbers listed.

Entering phone numbers to a distribution list can be done in two ways manually or automatic logging.

Note: Using the TextMagic feature mobile numbers can only be entered manually.

There are two methods used to add phone numbers to a distribution list. If using "TextMagic" as your SMS service phone numbers will need to be added manually. If using either of the USB dongles to provide the SMS service phone numbers can be logged and un-logged from lists automatically by texting unique join and leave passwords to the SIM card number of the USB dongle, see below for further details.

Multiple distribution lists can be created, each list would require its own unique "Name" and unique "Join" and "Leave" keywords, see below for further details:

Click on the distribution list module in the list and the module configuration data will Appear in the top right corner of the modules screen, as shown below:
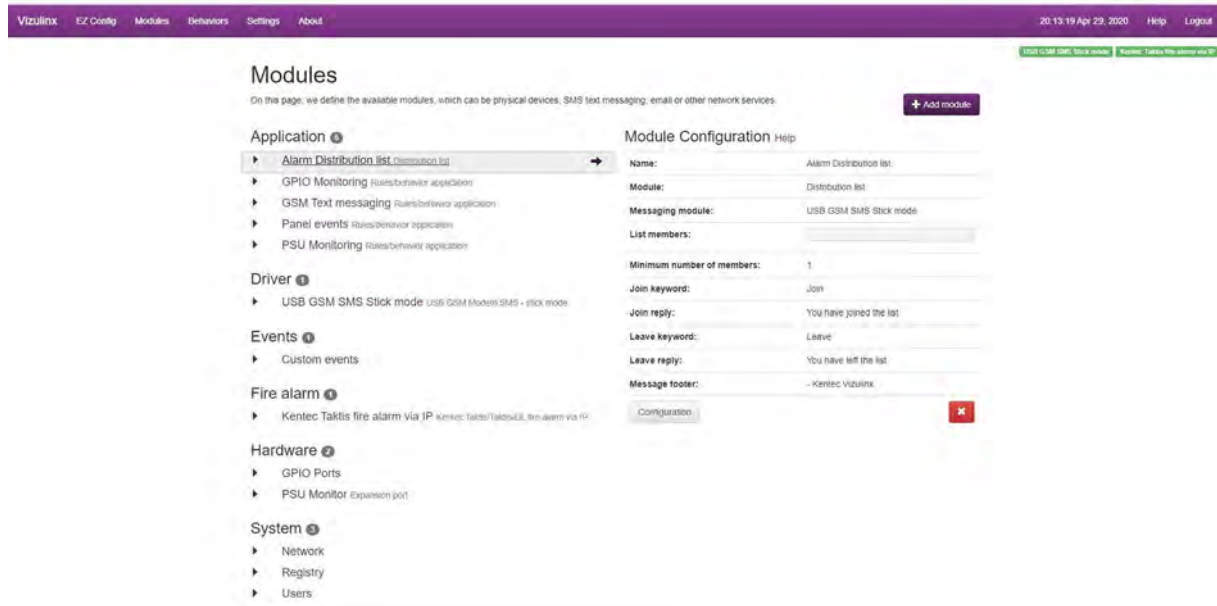
The module shows the current configuration for this module, to modify the configuration settings shown click on the "Configuration" button to open the Distribution list configuration window.
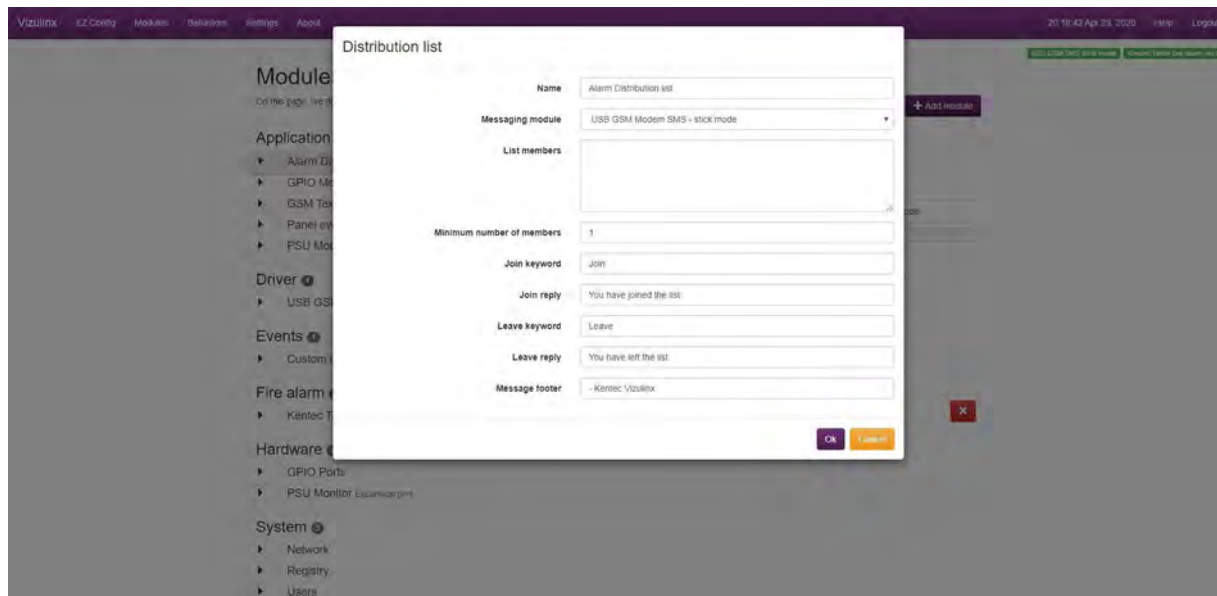
The available configuration settings are as follows:

Name - This is user changeable text to describe the distribution list, default value is Alarm distribution list which is based on the default behaviours set based on the EZ configuration. Multiple distribution list modules can be added to the Vizulinx to suit different criteria, each list will require a different and can be configured with differentmobile numbers.

Example:

Service team distribution list – All mobile numbers on the list will be the staff who are responsible for service and maintenance only. Could be setup to receive alarm and fault notifications, see behaviours section of the manual.

   Management list - All mobile numbers on the list will be site/departmental managers. Could be setup to receive alarm messages only, see behaviours section of the manual.

There is no limit to the number of different distribution list modules that can be created on the Vizulinx, however it is important each new distribution list has its own unique name.

Messaging module -This is the method used to send text messages to the numbers on this distribution list, again the default setting will be based on the EZ configuration selections. It is possible to combine either of the USB text messaging solutions with the TextMagic solution to provide some redundancy. If more than one text messaging option has been configured you can select which option to use with the distribution list by clicking on andselecting from the drop down list.

List members - This window show the mobile numbers which are currently logged onto this distribution list.

Note: If the TextMagic option was selected during EZ configuration any mobile numbers that were entered at that stage will be displayed in the members list.

To manually add numbers to the list click on the members list box and type additional numbers, numbers must be entered with the country code i.e. +44 etc. After entering each number press enter before entering a new number.

If using the USB stick or HiLink modems for text messaging they provide a unique feature which allows users to log their own mobile numbers on or off distribution lists as required using join and leave keywords.

Minimum no. of members - This shows the minimum number of mobile numbers that must be entered for the list, at least 1 number is required.

Join keyword - As stated above when using either of the USB modems for text messaging they provide the unique feature of automatic logging of mobile numbers to the distribution lists.

The join keyword is a passcode that can be sent by text to the registered number of the SIM card used in the USB modem (stick or HiLink), the mobile number used to send the join keyword will be automatically added to thedistribution list.

This allows users to register their mobile numbers on the distribution list without and third-party intervention.

The default join keyword "Join" should be changed to a unique keyword for added security. Click on the join keyword box and type in your unique join keyword.

Important! Where multiple distribution lists have been set-up each list must have a different join keyword.

Join reply - Users who have texted the join keyword to the Vizulinx module will receive a confirmation text response, a join reply. The default join reply is shown in the screenshot this can be customised by clicking on the join reply box and typing in your required reply message. This message will be received by the users registered mobile number as confirmation they have joined the list and will be receiving text messages from the Vizulinx system.

Leave keyword - As well as being able to log their mobile number onto the distribution list users can also automatically remove their mobile number form the list by texting the leave keyword to the same mobile number used to join the list. This will remove their mobile number from the list and therefore they will receive no text messages.

The default leave keyword "Leave" should be changed to a unique keyword for added security. Click on the leave keyword box and type in your unique leave keyword.

Important! Where multiple distribution lists have been set-up each list must have adifferent join keyword.

Leave reply - Users who have texted the leave keyword to the Vizulinx module will receive a confirmation text response, a leave reply. The default leave reply is shown in the screenshot this can be customised by clicking on the leave reply box and typing in your required reply message. This message will be received by the users registered mobile number as confirmation they have left the list and will no longer be receiving text messages from the Vizulinx system.

Message footer -This is the text that appears at the end of the text message. This can be customised by clicking on the box and typing the required message footer.

Web Application -This is a module which allows the Vizulinx to link to custom Apps. There are two Apps currently available from Kentec:

Modbus viewer - This App can be used to test the Modbus configuration.The App reads the Modbus data sent by Vizulinx and converts it back into readable data enabling the user to check Modbus is sending the correct data.

BACnet object ID calculator - This App is a handy calculator tool for checking BACnet object IDs. The calculator works in two ways – it can be used to calculate the panel, zone or device data associated with an object ID or it can calculate an object ID by entering the

For further information and availability of web Applications contact Kentec.

Driver

This group of modules contains driver modules for hardware that is connected to the Vizulinx currently this contains two drivers for USB modem support.

Important! Vizulinx is only provided with one USB port therefore will only support one USB modem, the relevant USB modem type should be selected as required.

USB GSM SMS Stick Mode

This driver supports the use of the USB stick mode modem with the Vizulinx. Configuration settings available for this module are as follows:

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the "Configuration" button and typing a new name in the box.

Signal level triggers - These levels are set to monitor the signal strength of the GSM network values can be set during the EZ configuration for USB GSM SMS stick mode option.

Changes in signal strength will be displayed on the Vizulinx events screen.

The default values are the optimum signal level values for mobile networks and the recommendation is to not change them.

Default: Excellent -75,Good -85,OK -95,Marginal -120

USB GSM Modem SMS/DATA – Huawei HiLink

This driver supports the connection of Huawei HiLink modems to provide SMS text and e-mail messaging using the GSM network. Configuration settings available for this module are as follows:

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the "Configuration" button and typing a new name in the box.

Network mode -This is the mode in which the modem will operate and can be set during the EZ Configuration for USB GSM modem HiLink option.

Disable internet access - This setting will prevent the USB Wi-Fi dongle from connecting to the internet and will operate the dongle in GSM SMS mode only allowing the sending of text messages but no e-mail.

Enable internet access - This setting connects the USB Wi-Fi dongle when there is no other alternative internet connection. It can provide a level of redundancy for systems which use a LAN internet connection as primary internet access i.e. should the LAN connection the Wi-Fi dongle will take over connection to the internet.

Make preferred internet interface - This setting will make the USB the primary connection to the internet allowing the sending of SMS text and Zero config e-mail messages.

Events

These modules control how events are handled when they are received by Vizulinx. Only one module is available in this section which is "Custom Events".

Custom Events

Custom events can be used to funnel events from multiple modules into a common custom event that can be used as a trigger into other modules. E.g. All fault events received from the fire control panel can be created into one custom event labelled. This makes configuring of behaviours simpler and quicker by reducing the number of behaviours required for common event types.

Configuration settings for this module are as follows:

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the "Configuration" button andtyping a new name in the box.

Events - The list of custom events are created here, as default there will be custom events created for alarms and faults. The custom event is entered with the event type followed by the fields that are included with the event i.e. payload, topic.

Custom events for alarm and fault events will be created as default following the EZ configuration setup.

Fire Alarm Modules

These modules control the interface between the selected addressable fire alarm control panel and Vizulinx. Modules are provided for support Syncro and Elite type panels as well as Taktis and Taktis UL panel variants.

Note: Modules will work with branded variants of all Syncro and Taktis control panels

Kentec Syncro/Elite Fire Alarm API

This module supports the serial connection between a Syncro/Elite variant panel and Vizulinx. Available configuration settings are as follows:

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the "Configuration" button and typing a new name in the box.

Data source - Not configurable. Data source between Syncro and Elite variant panels are RS232 only.

Panel type - This allows the user to select from a panel type which is compatible with this module from the drop-down list. This will be automatically configured when the panel type is selected during EZ configuration but can be changed through this screen.

Modbus panel / loop mapping - If not using the Modbus feature this can be ignored. If using the Modbus feature this configures the mapping of Modbus addresses to panels and loops. See the Modbus section of this manual for details on Modbus mapping.

Modbus module - Not configurable. Vizulinx can only be a Modbus slave device.

Kentec Taktis/Taktis UL Fire Alarm via IP

This module supports the serial connection between a Syncro/Elite variant panel and Vizulinx. Available configuration settings are as follows:

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the "Configuration" button and typing a new name in the box.

Host IP or URL - This is the IP address of the fire panel the Vizulinx is connecting with. This information will be configured during the EZ configuration setup but can be changed through this screen.

Port - This is the port used for communication between Vizulinx and the fire panel. This information will be configured during the EZ configuration setup but can be change through this screen.

Panel type - This allows the user to select from a panel type which is compatible with this module from the drop-down list. This will be automatically configured when the panel type is selected during EZ configuration but can be changed through this screen.

Loop offset mapping - If loop offset is used on a Taktis then it is necessary to map this in Vizulinx, if mapping has been done during the EZ configuration it will be shown here. If you wish to modify the loop offsets or add additional panels then it can be done here. Loop offset mapping will be shown as the Panel number and starting loop number of each panel – example: P2L8 is panel 2 with a starting loop number of 8. Enter each panel on the network with it starting loop number based on the offset i.e. P2L8, P3L15, P4L32.

Note: it is not necessary to include panel 1 in the mapping as this generally will always start at loop 1.

Modbus panel / loop mapping - If not using the Modbus feature this can be ignored. If using the Modbus feature this configures the mapping of Modbus addresses to panels and loops. See the Modbus section of this manual for details on Modbus mapping.

Modbus module - Not configurable. Vizulinx can only be a Modbus slave device.

BACnet module - If not using the BACnet feature this setting can be ignored. If using the BACnet feature this will need to be set as BACnet. For details on BACnet configuration see BACnet section of this manual.

Hardware Module

Enables configuration of the various inputs that are used for monitoring external equipment connected to Vizulinx i.e. conventional panels, third party equipment, power supplies etc.

GPIO Ports

16 GPIO (General Purpose Inputs & Outputs) are provided on the Vizulinx module which can be configured to monitor an output from any other equipment. The inputs are as default high and are pulled low to activate, behaviours can be created to activate when the pin changes state from high to low or low to high as required. If a conventional fire panel was selected in the quick start wizard i.e. Sigma CP, Sigma XT etc. these pins will be pre-configured to specific panel functions with pre-configured ID names. Port A supports GPIO pins 1-8 and Port B supports GPIO pins 9-16. The configuration options available with this module are as follows:

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the "Configuration" button and typing a new name in the box.

Port A mode - This selects whether the port A pins are inputs or outputs. Port A supports pins 1 to 8

Port B mode - This selects whether the port B pins are inputs or outputs. Port A support pins 9 to 16

Port names - This is the list of ID names allocated to the GPIO pins these are user configurable. The list correlates to the pin number sequence, wherever the pin ID Appears on the list this is the pin number it is linked to i.e. the 1st pin ID on the list relates to GPIO pin 1, the 2nd pin ID on the list relates to GPIO pin 2 etc.

Debounce -This specifies how long a GPIO pin must be active for before the relative action is instigated. Debounce reduces the possibility of false activations. Default:150ms

Expansion Port

The Vizulinx has two additional 14 pin IDC connectors Expansion port A (Marked "PSU fault") and Expansion port B these are mainly for future expansion. However both ports have two pins that are available to be used, expansion port A uses pin 1 as default to monitor the fault output on the power supply unit used to power the Vizulinx. Activation of the pin will trigger a power supply fault event. Configuration options for the Expansion ports are as follows:

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the "Configuration" button and typing a new name in the box.

Port - Select which expansion port you want to configure.

GPIO 1 Mode - Selects whether GPIO pin 1 on the expansion port is an input or an output.

GPIO 2 Mode - Selects whether GPIO pin 2 on the expansion port is an input or an output.

Port names - Names Applied to the two GPIO pins 1 & 2, these are default "Input 1" and "Input 2". These are user configurable and can be changed to describe the operation of the input/output.

PSU Monitor

This module is created as default following the EZ configuration and pre-configures pin 1 on expansion port A (PSU Fault) as a power supply fault input which can be used to monitor the fault output of an external PSU. Configuration option for this option are as follows:

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the "Configuration" button and typing a new name in the box.

Port - Select which expansion port you want to configure.

GPIO 1 Mode - Selects whether GPIO pin 1 on the expansion port is an input or an output.

GPIO 2 Mode - Selects whether GPIO pin 2 on the expansion port is an input or an output.

Port names - Names Applied to the two GPIO pins 1 & 2, these are default "Input 1" and "Input 2". These are user configurable and can be changed to describe the operation of the input/output.

Serial Port Interface

This module provides support for a serial port interface, it will be configured as default to RS232 if a Syncro or Elite style panel is selected at EZ configuration stage. Configuration options for the module are as follows:

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the "Configuration" button andtyping a new name in the box.

Serial port - Selects the port you wish to use as a serial port interface.

Settings - This sets communication parameters for the port.

System Module

This module is created as default and covers information relating to the Vizulinx system.

Network

This configures the settings associated with the two Ethernet ports 0 and 1 used for networking and IP communications with other equipment such as a BMS.

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the "Configuration" button and typing a new name in the box.

The two Ethernet inputs have identical configuration options, Ethernet 0 is configured as a fixed address and Ethernet 1 is configured as DHCP as default. Configuration settings for the Ethernet ports are as follows

Ethernet 'n' - Configures the Ethernet output as a fixed IP address or DHCP. Fixed address allows manual configuration of the Ethernet port settings. DHCP enables the Vizulinx to automatically detect the connected network and allocate an available IP address.

The following settings are only required if the Ethernet port is configured as fixed IP address.

IP Address - Enter a suitable IP address to match the network or control panel the Vizulinx is connected to. Ethernet 0 has a default IP of 192.168.100.250.

Netmask - The network or panel connected will have a subnet mask address which must beentered in this box. Ethernet 0 default subnet mask 255.255.255.0.

Gateway IP - IP address of the gateway which controls the network or panel connection.

DNS Nameservers - IP address associated with the network or panel must be entered here.

Registry

The registry stores commonly used values that can be referred to when creating events, messages etc. Configuration options available for this feature are as follows:

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the "Configuration" button and typing a new name in the box.

Values - The module can be configured with values that are set when the system powers on by entering "=" lines i.e."site=Building2".

Whenever a value changes the module triggers a "Registry item updated" event.

This module also automatically monitors all online and offline events and sets values using the key "registry online:"which is replaced with the module's unique identity. Registry values are available in templates using the format{{registry}} e.g. where the value "site=building 2" exists in the registry a message template containing {{Registry site}} will automatically replace this with "building 2" in the message.

When the site name is entered during the EZ configuration it will automatically Appear in this box.

Users

This module controls the user and login password function. There are no user configurable settings available other than being able to customise the name.

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the "Configuration" button and typing a new name in the box.

Service Modules

These modules control the various services that are required to provide the Vizulinx feature i.e. E-mail, messaging, SMS messaging, Modbus, BACnet etc.

These modules will be auto configured when Vizulinx is setup using EZ configuration. This screen allows access to modify the modules set-up and see more information.

Interval Timer

This provides the ability to create a timed event (tick) from Vizulinx. A behaviour can be created which activates every time this tick occurs check communications or test the signal to other equipment connected to Vizulinx i.e. Modbus heartbeat. This screen enables us to amend the settings associated with the module. The configuration settings for this feature are as follows:

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the "Configuration" button and typing a new name in the box.

Send tick on power up - This enables the Vizulinx to send its first tick on power up

Interval between ticks (secs) - This is how frequently the Vizulinx will continue to send ticks in seconds. An example would be every 10 secs the tick occurs which triggers a behaviour which subsequently activates a Modbus address, this creates a heartbeat signal to monitor the Modbus connection.

SMTP Outbound Mail

This is the service module which controls the SMTP outbound mail feature of Vizulinx. If this messaging option is selected during EZ configuration this module settings will be automatically configured. This screen enables us to amend the settings associated with the module. Configuration settings available are for this module are as follows:

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the Configuration" button and typing a new name in the box.

Host server URL - This is the URL of the e-mail server.

Port - The TCP port used to communicate with the server.

Login - Login ID required to access the e-mail server.

Password - Password corresponding to the Login ID required to access the mail server.

From - This is an e-mail address which identifies to the recipient where the e-mail has come from.

Zero Configuration E-mail Service

This controls the service required to run the zero configuration e-mail function. As the description states there is no configuration available for this module other than being able to customise the module name.

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the "Configuration" button and typing a new name in the box.

TextMagic SMS Service

This controls the service required to run the TextMagic SMS function. If TextMagic is selected as a messaging option during EZ configuration the settings for this function will automatically be configured. This screen enables us to amend the settings associated with the module. Available settings are as follows:

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the "Configuration" button and typing a new name in the box.

Username -This is the user name used to login to your TextMagic account.

API V2 Key -This is the alphanumeric code which securely links the Vizulinx to your TextMagic account. This is available from your TextMagic account.

Modbus Slave (be a device)

This service controls the function of the Vizulinx when configured as a Modbus slave device.If Modbus is selected as an integration option during EZ configuration the settings for this function will automatically be configured. Available configuration settings are as follows:

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the Configuration" button and typing a new name in the box.

TCP Port - This is the port for communication with Modbus and is default 502.

For further details on Modbus feature see the Modbus section of this manual.

BACnet

This is the service which controls the functionality of Vizulinx when configured as BACnet device. If Modbus is selected as an integration option during EZ configuration the settings for this function will automatically be configured. Available configuration settings are as follows:

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the Configuration" button and typing a new name in the box.

List of objects - This is a list of object ID's allocated to the fire alarm system. The list is based on the panel config file uploaded into Vizulinx and shows the object ID followed by the user descriptions allocated to the panel, zone or device in the panel config. For full details on BACnet and object ID allocation see the BACnet section of this manual.

BACnet ID - This is an ID number used to identify the Vizulinx module on a network. The default ID is 250101 however this can be changed should it conflict with any existing ID's on the BACnet system. To change click on the box and type in the new ID number or use the up and down arrows to scroll.

Broadcast IP - This is the IP address the Vizulinx unit uses to transmit information this should be set as required for the BACnet system.

Broadcast unsolicited COV - Support is provided for solicited and unsolicited COV (Change of Value) controlled by the tick box as shown in the screenshot above. Solicited (subscribed) COV – Vizulinx must send a subscribe request and wait for a response from the BACnet server before it can send its changes of value. Unsolicited (Unsunbscribed) COV means the Vizulinx can send all changes of value without the need for a subscribe request to the BACnet server. Tick or untick the box as required.

Network Modules

These modules control functions relating to network connectivity. The modules contained in this section are as follows:

Modbus TCP 1 – bit client (Connect to a device)

This function is currently not available

Network Connectivity Checker

The Vizulinx requires a connection to the internet to enable e-mail messaging either via LAN or USB GSM HiLink dongle. This module enables Vizulinx to monitor the internet connection to ensure it is active, it monitors the connection by polling a configured selection of websites. When configured a network connectivity checker icon will Appear in the top right of the Vizulinx window this will be green if OK and red if connection has failed.

Name - Name is the description of the module i.e. what it does. The name can bechanged to something more descriptive as required by clicking on the Configuration" button and typing a new name in the box.

HTTP(S) to check - This is a selection of websites that Vizulinx will periodically try to connect to checking the internet connection is active. Vizulinx will try each address on the list in turn, if no responses are received a network connectivity fault will be indicated. Two default addresses are configured https://bbc.co.uk & http://google.co.uk additional addresses can be added as required.

Interval between checks (minutes) - This is the frequency at which the Vizulinx will carry out the internet connectivity check.

Timeout seconds - The Vizulinx will check all listed websites in sequence and the time-out is how long it will wait for a reply before trying the next web address.

TCP Client

Function not available

TCP Server

Function not available

Parser/Protocol Modules

These modules control specific functions such as regular parser expression.

Regular Parser Expression

This is a function available when connecting to a Syncro/Elite style panel which communicates to the Vizulinx using serial data connection. Regular expressions provide advanced data processing. This module buffers incoming data until a match is found then it creates an event based on the matched data. A knowledge of regular expression parser is required to be able to use this function.

Note: For an interactive online resource and tool see https://regex101.com/

Name - Name is the description of the module i.e. what it does. The name can be changed to something more descriptive as required by clicking on the Configuration" button and typing a new name in the box.

Data source - This is the data source that is searched of the regular expression.
This can only be Serial Port Interface

Regular expression -This is the expression the Vizulinx will search for in the serial port interface data.

Section 6
Behaviours

The behaviours screen is accessed by clicking on the "Behaviours" tab in the header bar.

Behaviours allow the user to define cause and effect fire alarm mapping from and to the connected devices/services.

Each connected device/service creates and/or listens for events, these events can be linked to create a range of system operations - from sending a text message (SMS) to the building owners mobile phone when there is a fire alarm, to sending an email to the maintenance engineer whenever there's a fault.

On the behaviours screen it will list the behaviours that have been set. Custom behaviours will be automatically set based upon the selections made within the EZ configuration.

Creating Behaviours

Behaviours are constructed of four main parts: Source, Event, Destination, Action

Source - This is the service, input or device which is going to trigger the behaviour.

Event - This is the event type the source must see which will trigger the behaviour

Destination - This is the service, input or device which is going to be activated by the source/event

Action - This is the action we want the destination to take when the behaviour is triggered

Example behaviour 1:
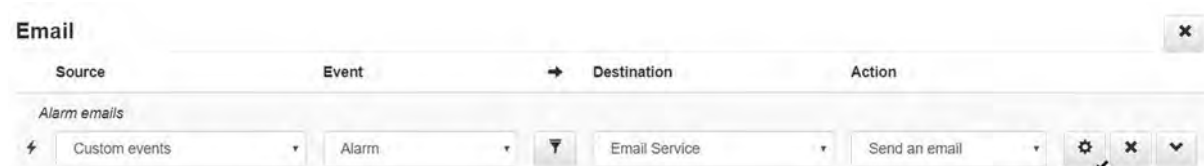
The above screenshot shows a rule which sends an e-mail when an alarm is received. The rule shows if an alarm condition is activated within custom events Vizulinx will activate the e-mail service to send an e-mail. The e-mail address would be configured within the e-mail service module.

Example behaviour 2:
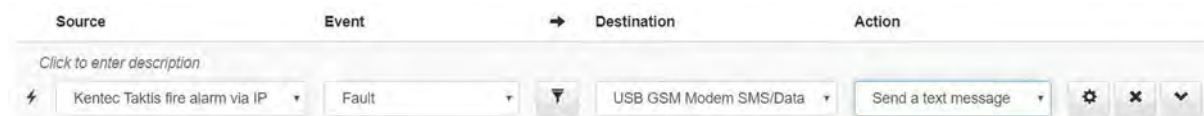
The above screenshot shows a different message which states any alarm that occurs on the Taktis Fire Alarm panel will send a text message using the USB GSM modem SMS/Data (HiLink modem). The number to send the message will be configured separately.

There are many source types which can be selected depending on the system configuration selected, a full list of source types and associated events is shown in **Appendix A** at the rear of the manual.

There are no identified limits to the number of behaviours that can be created, to create a behaviour the process is as follows:

Click the "Add new behaviour" button to add the new behaviour:
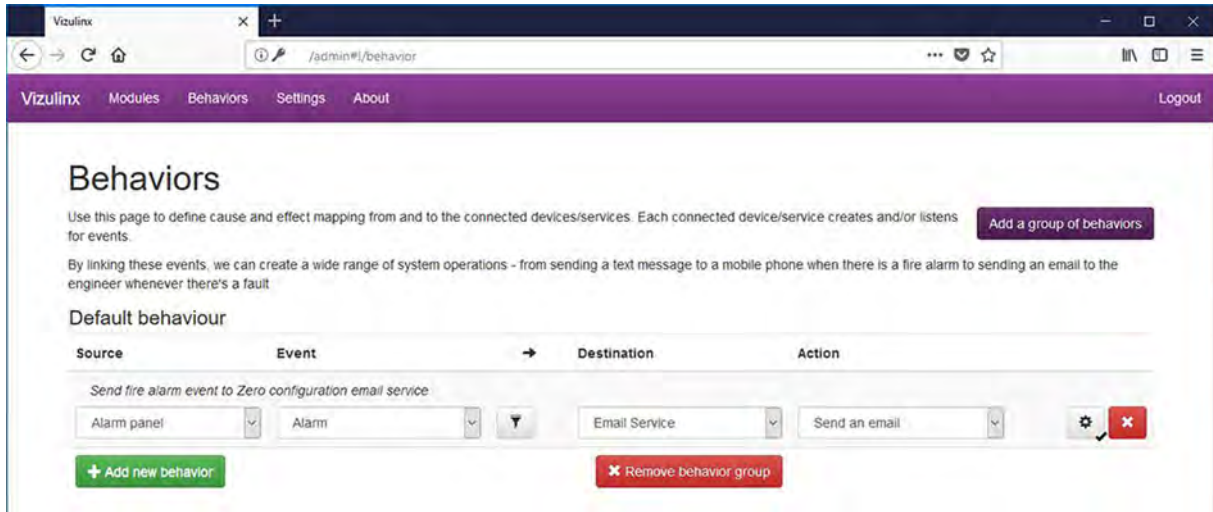
Complete the Source/Event/Destination/Action as appropriate by selecting options from the drop-down menus.
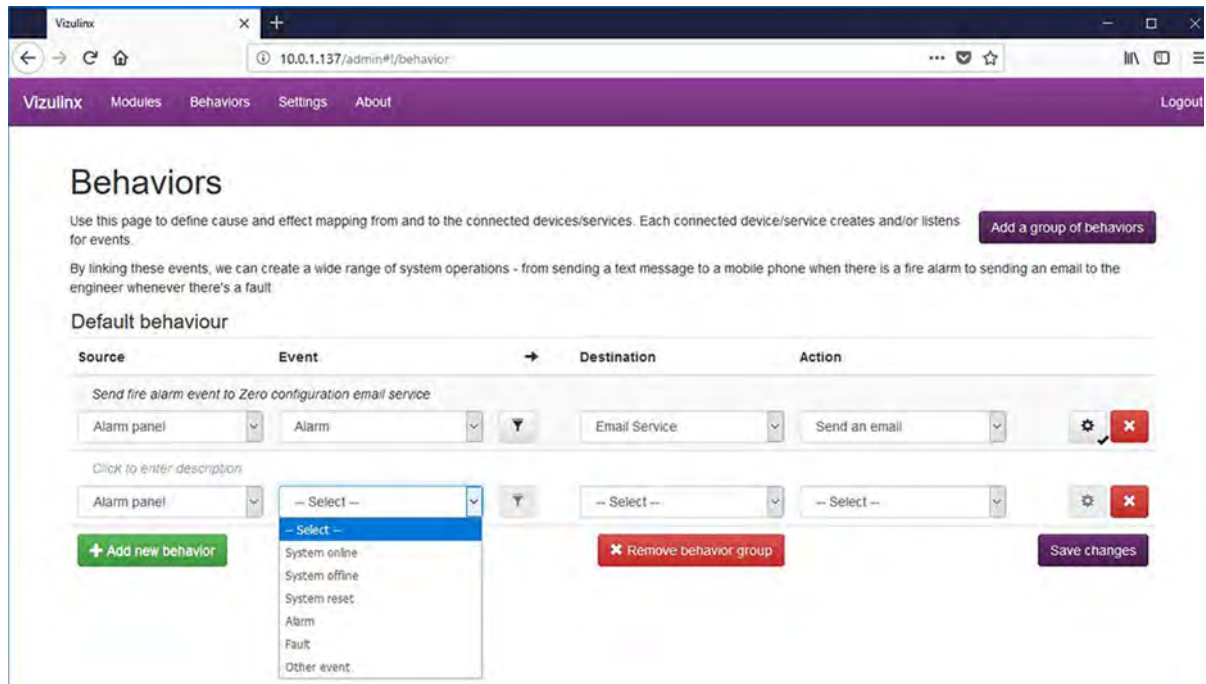

Click on "Save changes"

Customising Behaviours

Behaviours can be further enhanced by adding filters to the source and event data and customising the destination and action settings.

Adding a Behaviour Filter

A filter adds more control over a behaviour to subsequently provide more control over the functionality of the Vizulinx system.

Example of a filtered behaviour:
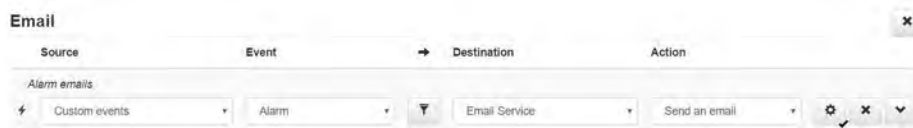
If we return to our example behaviour Vizulinx will send an e-mail whenever an alarm appears in the custom events, this is any alarm from the control panel/network regardless of node, zone, device etc.

Between the source/event data and the destination/action data there is a button with the filter logo on it, click on this and the filter screen will appear, click on add filter and the boxes Field, Test, Value and Action will appear. These boxes can be configured to provide the required filter of the Source/Event data.

The original source/event data looks at any alarm, let's say we want to narrow that down so that the behaviour an alarm from custom events will only trigger the behaviour if that alarm is in zone 1.
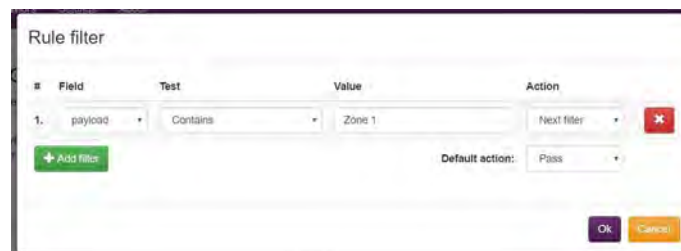
The configurable boxes are as follows:

Field - This is the field we want to apply the filter to. In the example above this is the payload field, this contains all of the information related to the alarm – Panel, Loop, Zone, Device etc

Test - This is the type of filter we want to apply – Equals, Contains, Less than, Less than or equal, Greater than, Greater than or equal

Value - This is the value we want the rule to apply to the filter. We can type in here the value required such as shown in the screenshot above "Zone 1"

Action - Is what we want to happen when that filter is matched i.e. all parts of the filter are true. Actions are Next filter, Pass, Stop

    Next filter - This will move on to the next filter in the list. Multiple filters can be applied toa single behaviour

    Pass - If the filter is true this will complete the behaviour as configured

    Stop - If the filter is true this will stop the behaviour from completing

Based on our example we now have a behaviour:
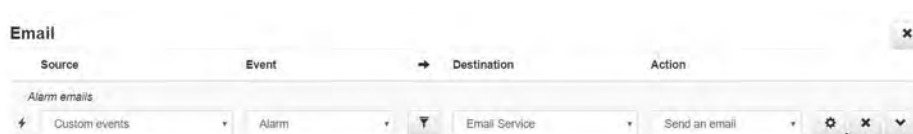
And a filter:

Our behaviour with the added filter now works as follows – Any alarm that appears in the custom events will be filtered and only alarms that contain the value "Zone 1" in the payload will be sent to the configured e-mail address.

Customising Behaviour Settings

Each behaviour has its own individual settings which can be customised to enhance the performance of the system, this allows customisation of the information sent/displayed when the behaviour is activated i.e. such as customising format of e-mail and SMS messages.

At the end of each behaviour line there is a button with the standard settings icon (small cog), clicking on this button will open the settings window form this behaviour.

If we again refer to our example rule below:
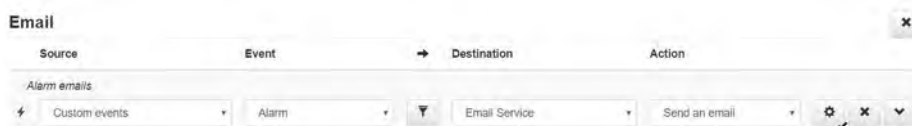
The rule configuration settings for this rule are as follows:
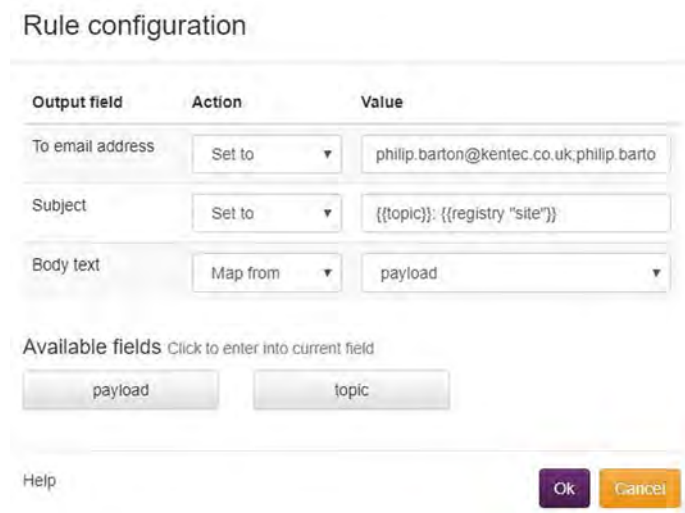
Rule configuration may look slightly different dependent on the behaviour settings, the example shown above shows how we can configure the e-mail messaging.

There are three sections which make up the rule configuration – Output field, Action and Value.

Output field
The output field relates to the information type i.e. in this example "To email address", "Subject" and "Body text" that make up the messaging

To email address - This is the e-mail address(es) we want to send the information associated with thisrule to. There are three possible actions which can be configured for this output field:

Pass thru - There are no e-mail addresses shown, the rule will use the e-mail addresses that were pre-configured during the EZ configuration process.

Set to - Allows the user to manually configure the e-mail addresses to beused. E-mail addresses configured during EZ configuration stagewill automatically be shown here. Click on the box and type new e-mail addresses, e-mail addresses must be separated by a semicolon when entering.

Map from - Is not applicable to this field however it will generally allow the user to map the field to specific information.

Subject - This is the information that is displayed in the subject line of the e-mail identifying what the e-mail relates to, this can be event type, site name etc. In the example shown above this is set to display the "Topic" which is the event status and is using the registry value "site" to display the site name. Behaviours that are created as default based on the EZ configuration will automatically show information. Three action settings are available:

Pass thru - This requires no configuration it will use default data from the panel and EZ configuration setup. This is based on event description and site name.

Set to - Allows the user to manually configure the e-mail addresses to be used. E-mail addresses configured during EZ configuration stage will automatically be shown here. Click on the box and type new e-mail addresses, e-mail addresses must be separated by a semicolon when entering.

Map from - Is not applicable to this field however it will generally allow the user to map the field to specific information.

Body text - This is the information shown within the body of the e-mail i.e. the relevant detail relating to the event. If the behaviour is configured to send an e-mail on an alarm condition the body text could display the detailed information relating to the alarm i.e. Panel, Loop, Zone, Device info. This body text can be based on data received from the alarm panel or can be customised to suit the customer requirements. Especially where language translations are required.

Pass thru - This requires no configuration it will use default data from the panel and EZ configuration setup to create the e-mail message. This is based on event type, panel, loop, device, location text data.

A typical default message format would be as shown:

> Print room
> DISCONNECTED FAULT
> ADR=13 LOOP=3 ND=1 BACNET TEST PANEL
> ZONE 10
> Fault 1 Jan 2000 01:00

Set to - Allows the user to manually configure the body text of the e-mail message to be used. The message can be customised to contain whatever message is required and can be created in different languages as required. For example the message could be a simple notification message without the loop, zone device data i.e.

Fire alarm activated!!!

Map from - Where "Pass thru" sends all data provided from the fire panelassociated with the event. Map from uses the data from the panel but allows us to select what information we wish to include. Depending on the source selected the options available to "Map from" will vary.

There are two main types of Map from events for most behaviour options these are:

Topic - This maps the event type name from the panel i.e. Alarm, Fault, Disablement etc.

Payload - This maps the full data packet associated with that event i.e. panel, loop, zone data etc.

On some rule configurations "Map from" will provide a selection of data that cancreate the e-mail message, see the screen shot below:
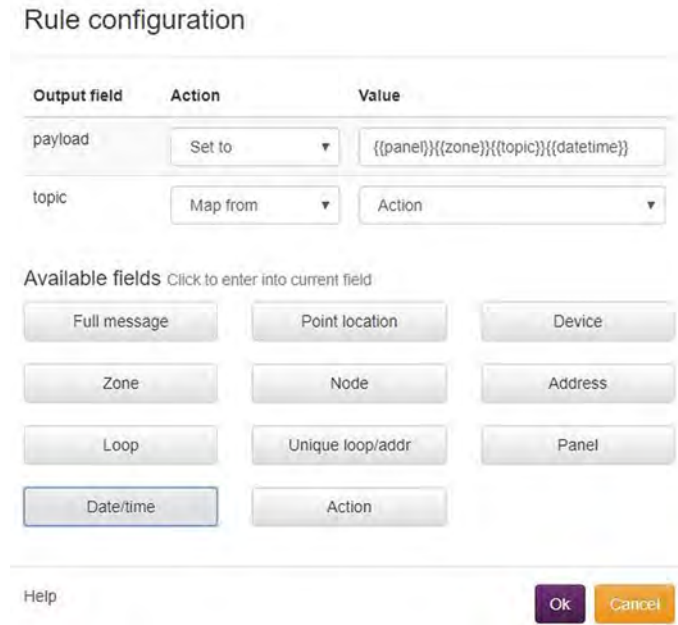
The map from options and the data they provide are shown in the following table:

Available field	Template	Description
Full message	{{payload}}	Displays the full message that appears on the fire panel display
Point location	{{location}}	Displays the location text as configured in the panel for the active device i.e. office, kitchen, workshop etc.
Event text	{{event-text}}	Displays the event text i.e. Fire, Fault, disablement etc.
Device	{{device}}	Displays the device type responding to the event i.e. smoke detector, manual call point etc.
Zone	{{Zone}}	Displays the zone number of the active device/zone
Node	{{node}}	Displays the network address of the active panel
Address	{{adr}}	Displays the address number of the active device
Panel	{{panel}}	Displays the panel name as configured in the active panel
Date/Time	{{datetime}}	Displays the time and date of the event
Action	{{action}}	This is the action description configured within the panel for the active device.

To select one of the bits of data to include in your message click on the button and itwill appear in {{}} in the selected box. The data will be sent in the message in order itis shown in the box. The message format for the selection in the screenshot examplewill be as follows:

> BACNET TEST PANEL
> ZONE 10
> Fire 1 Jan 2000 01:00

Customising Behaviour Names
Behaviours created following EZ configuration will be automatically grouped, the group name can be changed by clicking on the name text and typing in a custom description. Individual behaviour names can also be changed by clicking on the name text and typing in the new description.

Saving a Behaviour
When a behaviour has been added, deleted or modified the save changes button will appear under the behaviour line, the modifications will only be accepted when the save changes button is clicked.

Copying a Behaviour
Vizulinx provides the ability to create a new behaviour by copying an existing rule. This is a useful feature if you want to create similar rules with only a minor variation. At the end of each behaviour line is a button with a down arrow as shown below:
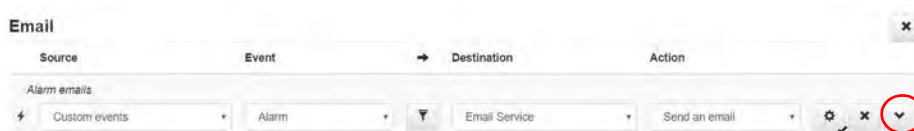
Clicking on the down arrow Vizulinx will automatically create an identical copy of the behaviour you clicked on, this can then be modified to suit without having to create the whole rule from the beginning.

Disabling a Behaviour
Behaviours can be disabled which means they will not complete even if the source/event data is valid. This can prevent the unnecessary activation of behaviours during fire system testing. To disable a behaviour click on the lightning bolt icon at the start of the behaviour line.
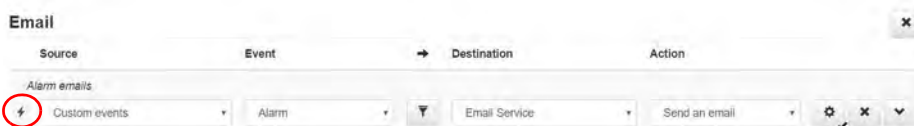
The lightning bolt icon will change to a prohibition symbol and the behaviour line will be highlighted in red as shown below.

To enable the rule click on the prohibition icon at the front of the line the icon will change.

Deleting Behaviours
Individual behaviours can be deleted by clicking on the '**x**' button at the end of the behaviour line.
Behaviour groups can be deleted by clicking on the '**x**' button at the top right of the behaviour group.
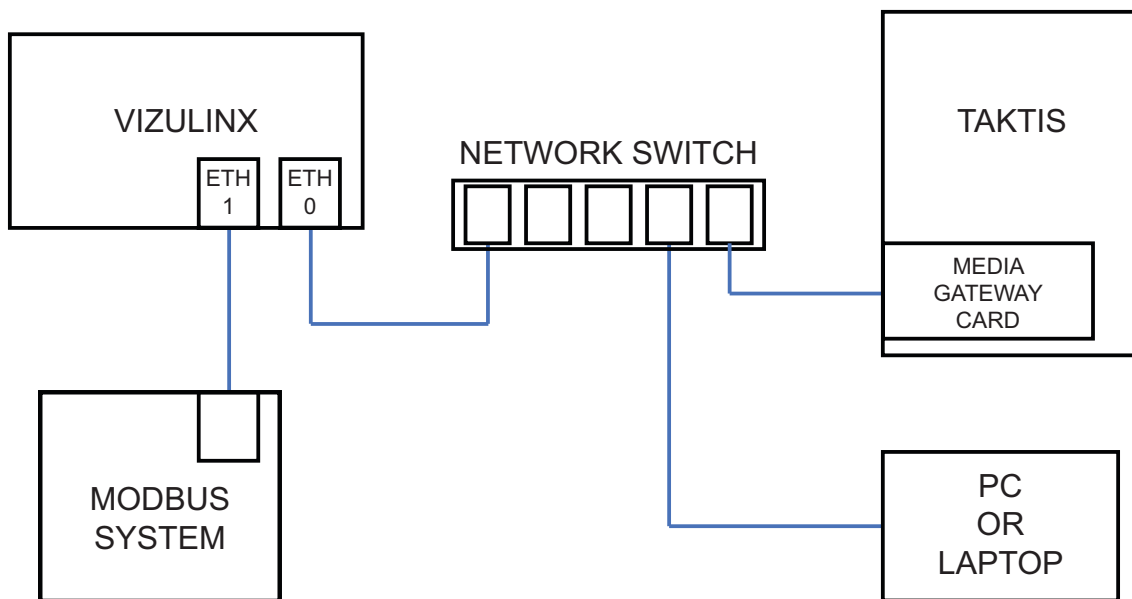
Section 7
Modbus

Vizulinx can be configured as a Modbus slave device allowing it to communicate various status conditions to other Modbus devices using Modbus TCP/IP. Modbus enables the fire alarm control panels connected to Vizulinx to integrate with other equipment such BMS (Building Management Systems), Plant control equipment etc

Modbus Connectivity

Vizulinx connects to Modbus using its Ethernet 1 (Eth 1) port, the port IP settings will need to be configured to match the Modbus system. If Vizulinx is used with a Taktis panel the panel will connect to Ethernet 0 (Eth 0), Syncro panels connect to Vizulinx using serial connection so do not require an Ethernet port.

Taktis Modbus system connectivity

Note: It is recommended the connection between Vizulinx is via a network switch, this will enable connection of the PC or laptop for configuration and diagnostics without disconnecting the Taktis.

Syncro/Syncro AS Modbus system connectivity
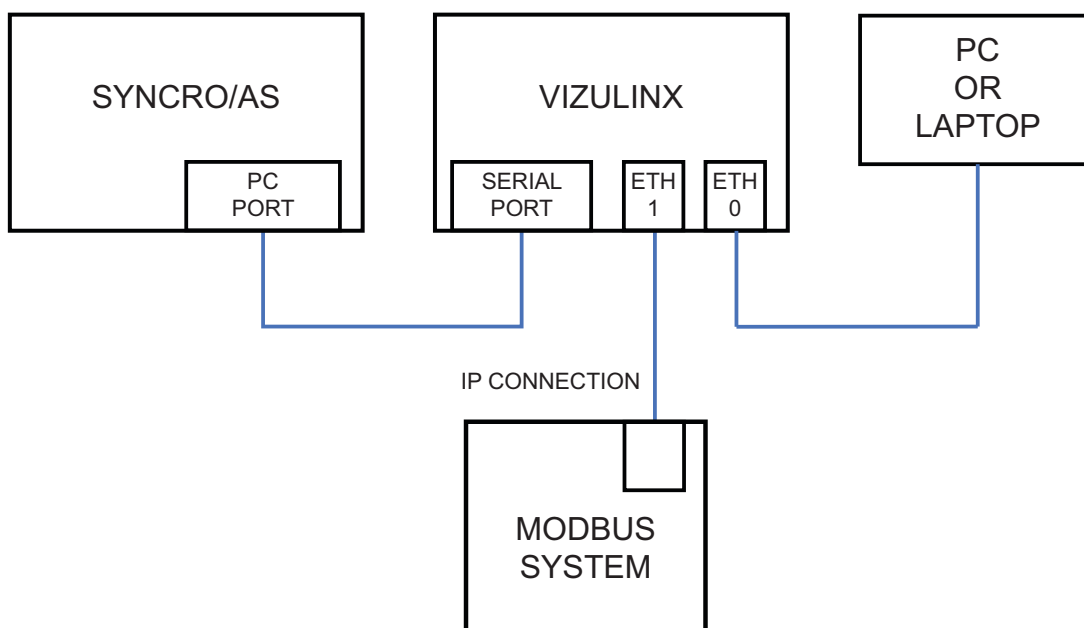
Vizulinx as a Modbus device does not have a specific Modbus address ID, Vizulinx is designed to listen to the MOD-BUS port and responds to any request from the Modbus system using the same ID used in the request in the reply packet.

Modbus Mapping for Addressable Systems

Modbus in Vizulinx has been made as easy as possible to configure, using pre-defined mapping of Modbus address-es for loops, zones and devices. Vizulinx is provided with 2000 Modbus addresses as standard which is adequate for small systems of up to 4 loops, the number of Modbus addresses can be increased by purchase of a license.

The default mapping of Modbus addresses is shown In the table below:

16 bit Input registers (Func 0x40)					
Modbus	Description	Values			
		Decimal	Bit	Flags	
				EN Panels	UL Panels
1 - 500	Zone status	0	-	Normal	Normal
501 - 1000	Panel status	1	0	Fire	Fire
		2	1	Evacuate	CO alarm
1001 - 2000	Device status Default mapping is by loop: Panel 1 Loop 1 – 1001-1250 Panel 1 Loop 2 – 1251-1500 Panel 1 Loop 3 – 1501-1750 Panel 1 Loop 4 – 1751-2000	4	2	Alert	Auxiliary
		8	3	Pre-Alarm	Pre-Alarm
		16	4	Security	Security
		32	5	Fault	Trouble
		64	6	Disablement	Disablement
		128	7	Tech Alarm	Supervisory
		256	8	Test	Test
0	Panel online	0 = Offline, 1 = Online			

Modbus Addresses 1-500
These Modbus addresses are allocated to the reporting of zone status with the addresses linked in zone sequence i.e. Address 1 = Zone 1, Address 2 = Zone 2 etc.

Each zone address has an associated flag shown in the table above which indicates the specific status of the zone. There are nine states that the zone can be in as shown in the table e.g. a fire in zone 6 will set bit 0 (Dec value 1) on Modbus address 6 to a value of 1.

Modbus Addresses 501-1000
These Modbus addresses are allocated to the reporting of panel status with the addresses linked in panel sequence i.e. Address 1 = Panel 1, Address 2 = Panel 2 etc.

Each panel address has an associated flag shown in the table above which indicates the specific status of the panel. There are nine states that the panel can be in as shown in the table e.g. a fault on panel 8 will set bit 5 (Dec value 32) on Modbus address 508 to a value of 1.

Device Status
These Modbus addresses are allocated to reporting the status of the devices on the detection loops across the panel/network of panels i.e.smoke detectors, heat detectors, Manual Call Points etc.

The Vizulinx unit is provided as default with 1000 x 16 bit addresses to indicate device status, this is enough to cover 4 detection loops with up to 250 x 16 bit device addresses per loop. Additional groups of 1000 x 16 bit addresses can be enabled on the Vizulinx module by purchasing a license from Kentec Electronics a license will be required for every 1000 addresses enabled, up to a maximum of 9999 device addresses. Each device address has an associated flag which indicates the specific status of the device.

Modbus Loop Mapping
Unlike Modbus addresses allocated to Panels and Zones which are fixed, the mapping of loops to available Modbus address is configurable.

The mapping of loops can either be configured during EZ Configuration when an addressable panel is selected, see below:

Select the panel number and loop number you wish to associate with that block of addresses, the panel loop selection does not need to be entered in sequence, any panel number and loop number can be allocated to any block of addresses this make is it easier to add additional panels and loops without affecting the existing Modbus address allocation.

Modbus mapping can also be configured by going to the modules screen and selecting the panel module and clicking on the configuration button.

In the module configuration table it shows the line "MODBUS panel/loop mapping:" along with the panel/loop mapping.

Clicking on the configuration button opens the config button shown above which allows the panel/loop mapping to be modified.

Mapping the Panels/Loops

The default panel/loop mapping is entered as P1L1,P1L2,P1L3,P1L4 which equals to Panel 1 Loop 1, Panel 1 Loop 2 etc. The address groups are allocated in the sequence the Panel/Loops are entered in the box i.e. P1L1 – 1st 250 addresses (1001-1250), P1L2 – 2nd 250 addresses (1251-1500) etc. Any additional panel/loop combinations entered into this section will take the next available 250 addresses.

The sequence entered can be reconfigured as required for example if we have a network of 3 x 1 loop panels connected to the Vizulinx unit we can reconfigure the mapping to P1L1,P2L1,P3L1 to match the system configuration. This method of sequencing makes it easy to add panels/loops to our system without having to reconfigure the Modbus address mapping e.g. If we have a network of 3 x 1 loop panels and mapping P1L1,P2L1,P3L1 and we upgrade Panel 1 to make it two loops we don't need to reconfigure the mapping sequence. The new panel/loop combination can be added to the end of the existing sequence and will take the next available group of Modbus addresses. i.e. P1L1,P2L1,P3L1,P1L2

Adding a Modbus License

As already mentioned the 1000 x 16 bit addresses provided as standard in the Vizulinx unit can be increased by purchasing an upgrade license. Each license will enable an additional 1000 x 16 bit addresses up to a maximum of 10000 addresses.

To add a Modbus license a license code will be required which is purchased from Kentec Electronics. To obtain the license code you must provide the Vizulinx hardware code to Kentec, you will then be provided with a license code which can only be used on the Vizulinx with the hardware code you supplied. License codes cannot be used on multiple Vizulinx units and cannot be transferred between Vizulinx units.

To enter a license code follow this sequence:

1. Connect a PC to Vizulinx and access the web-server

2. Login and go to the settings and information screen:
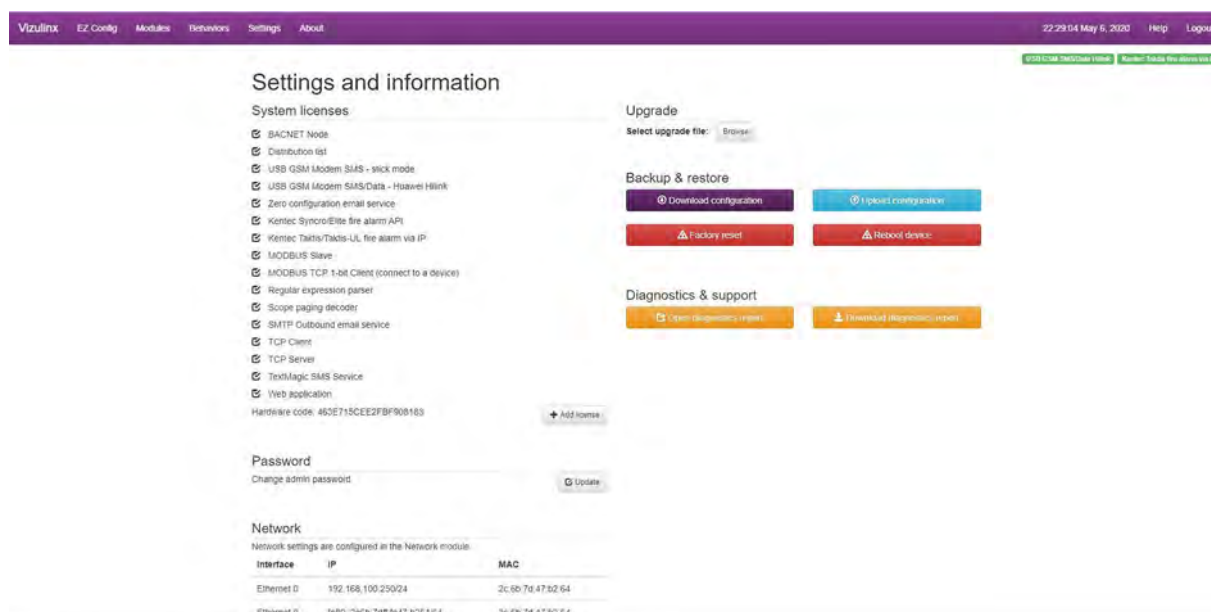
3. Type in the license code and click "Add" button

The new license will appear on the "System Licenses" list on the left of the screen and an additional 500 object ID's. Mapping of these additional addresses to panel/loops is done the same as previously described.
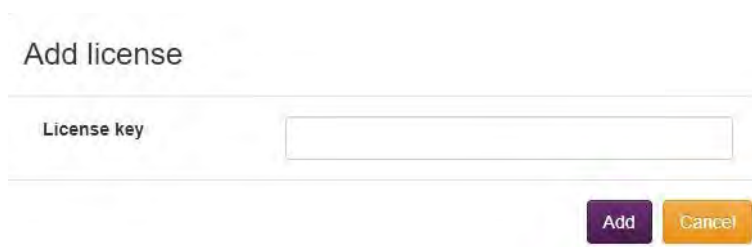
Modbus Mapping for Discrete Inputs

Discrete inputs are binary addresses which are allocated to single state devices such as the GPIO inputs and PSU fault input which can only be on or off.

17 x 1 bit Discrete inputs are allocated to the 16 x GPIO inputs and the PSU monitor input.

When one of the conventional/extinguishing panel modules is selected in the quick start wizard the 16 x 1 bit discrete outputs allocated to the GPIO are automatically pre-configured to match specific functions on the panel. The screen-shot shows the default GPIO allocation for a Sigma XT/A-XT:
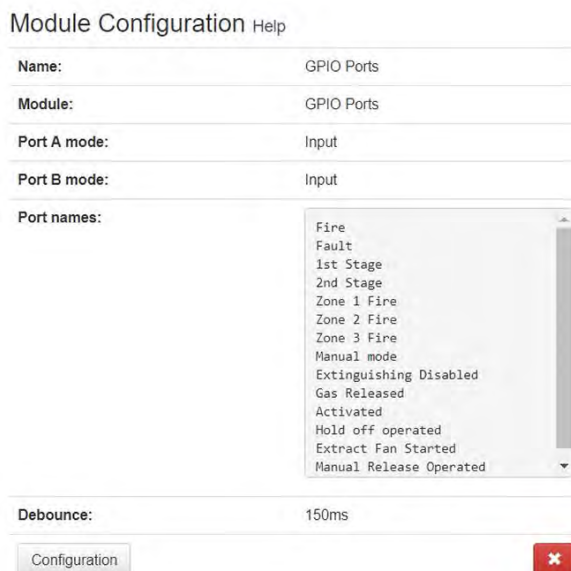
The port names box contains the pre-configuration for the GPIO inputs, the list is in input number sequence i.e. the first line of the list relates to GPIO input 1 and the last item on the list relates to GPIO input 16 e.g. activation of a Zone 2 Fire on the Sigma XT/A-XT will activate GPIO input 6.

The names and sequence of names can be re-configured as required by clicking on the configuration button which opens the configuration window.

GPIO inputs can be used to monitor outputs from any device and is not just restricted to Kentec Conventional/Extinguishing control panels.

16bit - Holding Registers (Fuc 0x03)		
Modbus address	Description	Values
1-16	GPIO inputs 1-16	Count of state changes for discrete inputs, wrapping back to zero after 65,535
17	PSU Fault	

Holding registers are used to monitor and log the number of state changes of the discrete inputs i.e. GPIO and PSU Fault. Every time a discrete input changes state its holding register will increase by 1 this information can be used for diagnostics, each counter will go up to 65.535 and will then wrap back to zero when full.
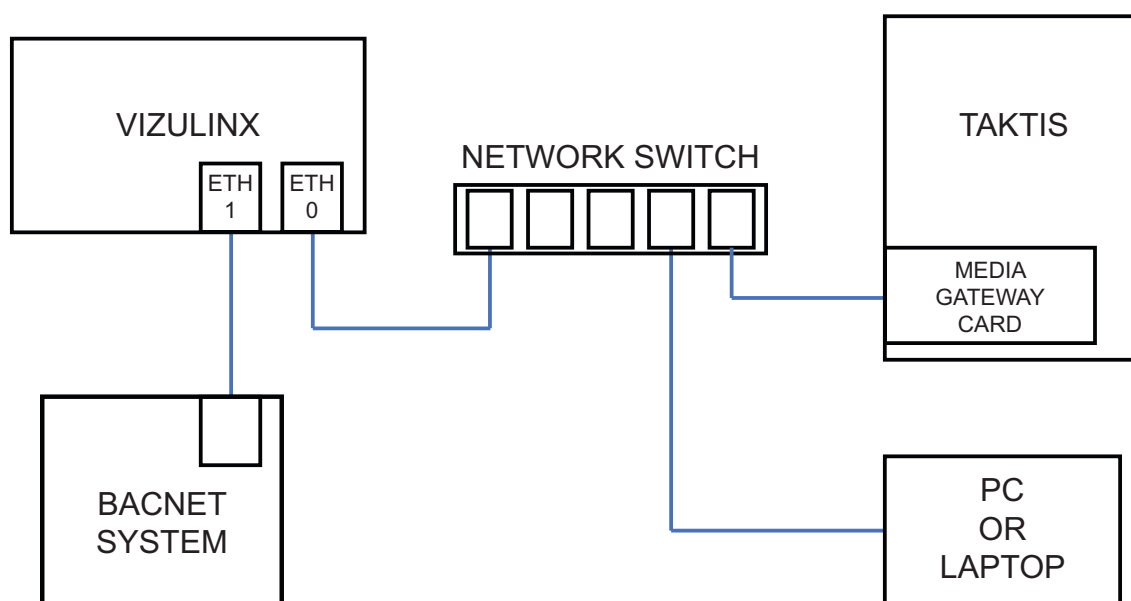
Section 8
BACnet

Vizulinx can provide BACnet IP communications to third party systems such as BMS for Taktis Systems and networks. Kentec have unique BACnet vendor ID which identifies the Vizulinx on BACnet as a Kentec product.

BACnet Connectivity

BACnet communicates to Vizulinx using its Ethernet 1 (Eth 1) port, the port IP settings will need to be configured to match the BACnet system.

Taktis BACnet system connectivity:

Note: It is recommended the connection between Vizulinx (Ethernet 0) and Taktis is via a network switch, this will enable connection of the PC or laptop for configuration and diagnostics without disconnecting the Taktis panel.

BACnet Configuration

Configuration and setup of the BACnet feature has been kept as simple as possible and can be done through the EZ configuration setup or manually through the Vizulinx modules screen, refer to these sections of the manual to see config settings.

Allocation of BACnet object IDs is done automatically based on the panel/network configuration, the panel/network configuration file is obtained using the panels LE2 software.

Once the LE2 panel/network config files is uploaded BACnet object IDs will be allocated for any Panels, Loops, Zones, Device addresses and sub-addresses found in the config file.

Vizulinx as standard will be provided with 500 object IDs which will be allocated on upload of the LE2 configuration file, the number of available BACnet object IDs can be increased by purchase of a license code from Kentec. Each license code will unlock an additional 500 object IDs, see add license part of this section.;

Appendix B of this manual shows the BACnet Protocol Implementation Conformance statement which provides details on the BACnet protocol used in Vizulinx.

BACnet Object ID Construction

The following table shows how BACnet object IDs are constructed:

Nibble	1/2 5		4				3				2		1				0			
Bit	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Panel	Not used						Panel 0 - 127						0x3ff								
Zone	Zone (0-2000)												0x3fe								
Device	Panel (0-127)						(Loop 0-16)				Device (0-255)								Sub-address (0-6)			

Flag	1	2	3	4	5	6	7	8	9
EN Panels	Fire	Evacuate	Alert	Pre-Alarm	Security	Fault	Disablement	Tech Alarm	Test
UL Panels	Fire	CO Alarm	Auxiliary	Pre-Alarm	Security	Trouble	Disablement	Supervisory	Test

BACnet Object ID List

A list of the allocated IDs alongside the user allocated description for that panel, zone or device can be seen in the modules screen. Click on the BACnet module and click on configuration button you will see the following screen which shows the list of allocated objected devices.
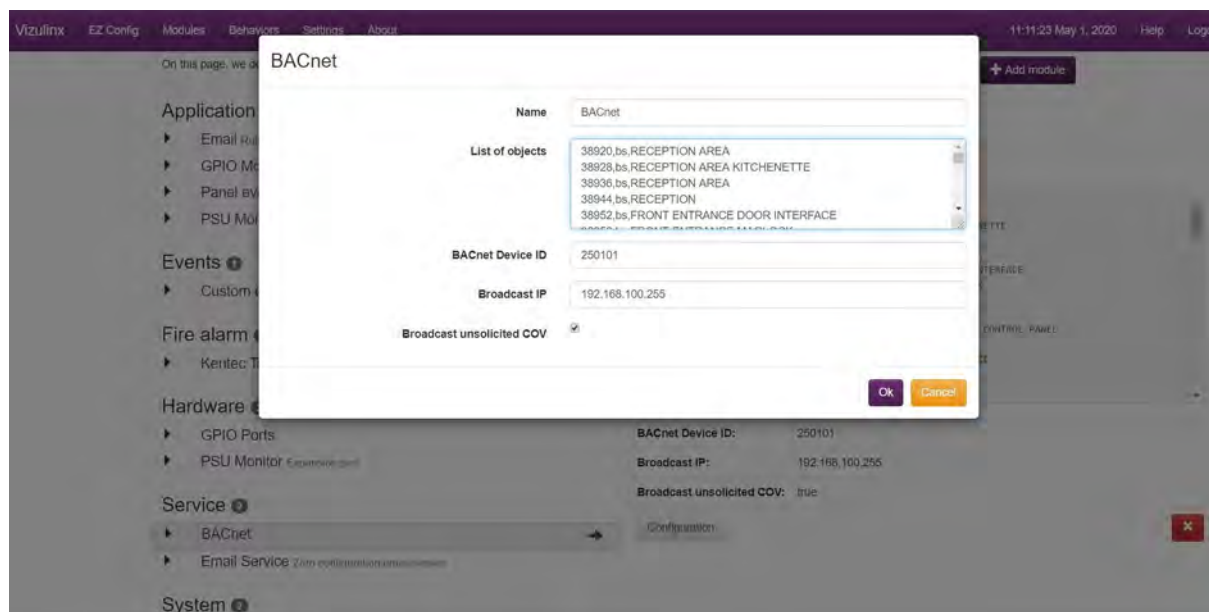
Adding a BACnet License

As already mentioned the 500 BACnet object IDs provided as standard in the Vizulinx unit can be increased by purchasing an upgrade license. Each license will enable an additional 500 BACnet object IDs.

To add a BACnet license a license code will be required which is purchased from Kentec Electronics. To obtain the license code you must provide the Vizulinx hardware code to Kentec, you will then be provided with a license code which can only be used on the Vizulinx with the hardware code you supplied. License codes cannot be used on multiple Vizulinx units and cannot be transferred between Vizulinx units.

To enter a license code follow this sequence:

1. Connect a PC to Vizulinx and access the web-server

2. Login and go to the settings and information screen:

3. Click on the add license button and enter the license key provided into the box when instructed:

4. Type in the license code and click "Add" button

The new license will appear on the "System Licenses" list on the left of the screen and an additional 500 object ID's. Mapping of these additional addresses to panel/loops is done the same as previously described.

Section 9

Specifications

Equipment			
Product Code	**Description**	**Colour**	**Size WxHxD (mm)**
K85000	Vizulinx - Module only	N/a	106 x 90 x 32
K85000 M2	Vizulinx - Housed version (M2)	Powder coat - Grey (BS-00-A-05)	385 x 310 x 90
K85110 AM3	Vizulinx - Housed version (AM3) 110V AC	Powder coat Red (RAL 3002)	369 x 481 x 110
K85240 AM3	Vizulinx - Housed version (AM3) 240V AC	Powder coat Red (RAL 3002)	369 x 481 x 110

Specifications		
K85000	module only operating voltage	9 - 30V DC
	module current consumption	200mA max @ 9V DC, 80mA max @ 30V DC
	Processor	AM3354 CPU 300-800-Mhz
	RAM	512MB
	1x USB type A port	For GSM and Wifi connectivity (via dongle)
	2x Ethernet ports	For connection to LAN and PC: Port 1 static IP (192.168.100.250) Port 2 DHCP assigned to plug into existing LAN
	Isolated RS232 port	Avoids ground faults
	16x General Purpose input/output	Inputs: 0v triggered, Outputs: default high switch low (0v). Provided in two groups of 8.
	3x Status LED's	Power (green), amber (activity), red (error)
	Packaged weight	1kg
K85000 M2 K85110 AM3 K85240 AM3	Power supply input voltage	K85000M2/K85240 AM3 - 230V AC +10%/-15% Model K85110 AM3 - 110V AC
	Power supply output current	2.5A (continuous)
	Standby battery capacity	K85000 M2 - 2 x 12V 7Ah SLA batteries (Yuasa NP) K85110 AM3/K85240 AM3 - 2 x 12V 12Ah SLA batteries (Yuasa NP)
	Packaged weight	3kg

Additional Information

Supported Operating System: Microsoft Windows.

Supported web browsers: Internet Explorer, Google Chrome, Mozilla Firefox, Opera

Contacting Kentec

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Appendix A
Behaviour Source/Events

This table shows the possible behaviour triggers based on source and event options. The source and event triggers available at any time will be dependant upon the Vizulinx configuration.

Source	Event	Comments
Custom Events	Alarm	Will trigger a behaviour when a custom event behaviour relating to an alarm is activated
	Fault	Will trigger a behaviour when a custom event behaviour relating to an fault is activated
Distribution list	User joined list	Triggers a behaviour when a user joins the distribution list
	User left list	Triggers a behaviour when a user leaves the distribution list
GPIO Ports	Pin changed state	Will trigger a behaviour when a GPIO pin has changed state
	Pin Low	Will trigger a behaviour when a GPIO pin has been pulled low (0v applied)
	Pin High	Will trigger a behaviour when a GPIO pin has been pulled low (0v removed)
Modbus Slave	Master has connected	Will trigger a behaviour when a master Modbus device has established communication with the Vizulinx
Network	Network interface up	Will trigger a behaviour when connection to the Ethernet network is established
	Network interface down	Will trigger a behaviour when connection to the Ethernet network has failed
Network connectivity checker	Connectivity online	Will trigger a behaviour when connection to the internet has established
	Connectivity offline	Will trigger a behaviour when connection to the internet has failed

Continued.

Source	Event	Comments
PSU Monitor	Pin changed state	Will trigger a behaviour when the GPIO pin used to monitor the PSU fault output changes state
	Pin low	
	Pin high	
Regular expression parser	Parser messaged	Will trigger a behaviour when Parser is messaged
Registry	Registry item updated	Will trigger a behaviour when a change is made in the registry data
RS232	Raw data	Will trigger a behaviour when raw data is received on the RS232 serial port
Syncro/Elite type panels	System on-line	Will trigger a behaviour when the RS232 connection between Vizulinx and Syncro/Elite type panels
	System off-line	Will trigger a behaviour when the RS232 connection between Vizulinx Syncro/Elite type panels has failed
USB GSM SMS/Data HiLink	Device online	Will trigger a behaviour when an active connection to the USB GSM HiLink dongle is established
	Device offline	Will trigger a behaviour when an active connection to the USB GSM HiLink dongle has failed
	Receive text message	Will trigger a behaviour when an active connection to the USB GSM HiLink dongle receives a text message
USB GSM SMS stick mode	Registered on network/Ready to send	Will trigger a behaviour when dongle has connected to the GSM network and has a signal
	Unable to send not connected	Will trigger a behaviour when dongle is unable to send text messages either due to low or no GSM network connection
Users	User has logged in	Will trigger a behaviour when a user logs into the Vizulinx through the web browser

Behaviour destination/actions

The sources and event behaviour listed in the previous table can be paired with the following possible Destination/ Actions to create a complete behaviour.

The available destination/actions available at any time will depend on the configuration of the Vizulinx features and services.

Destination	Action	Comments
BACnet	Set bit string	When associated behaviour source/ event is activated a bit string on BAC-net will be set
	Set binary input	When associated behaviour source/ event is activated a binary input on BACnet will be set
	Reset all object to default value	When associated behaviour source/ event is activated all BACnet objects will be returned to their default value
Distribution list	Send message to list members	When the behaviour source/event is activated a message will be sent to the mobile numbers in the distribution list. When multiple distribution lists have been created the destination must show the correct distribution list to send the message to
E-mail service	Send an e-mail	When associated behaviour source/ event is activated Vizulinx will send an e-mail message using the Zero config e-mail service
E-mail SMTP	Send an e-mail	When associated behaviour source/ event is activated Vizulinx will send an e-mail message using the SMTP e-mail server
GPIO Ports	Control GPIO pin	When associated behaviour source/ event is activated Vizulinx will control the status of a GPIO pin.
PSU Monitor	Control GPIO pin	When associated behaviour source/ event is activated Vizulinx will control the status of the GPIO pin used to mon-itor the PSU.
USB GSM SMS/Data HiLink	Send a text message	When associated behaviour source/ event is activated Vizulinx will send a text message.
USB GSM SMS - stick mode	Send a text message	When associated behaviour source/ event is activated Vizulinx will send a text message.

Appendix B
BACnet Protocol Implementation Conformance Statement

Date: 06/05/2020
Vendor Name: South Midlands Communications Ltd
Product Name: Vizulinx
Product Model Number: n/a
Application Software Version: 1.0.16 onwards
Firmware Revision: 1.0.16 onwards
BACnet Protocol Revision: 1.2

Product Description
This products maps generic fire alarm statuses to BACnet objects. Event notifications are sent to registered clients.

BACnet Standardized Device Profile (Annex L)

X BACnet Operator Workstation (B-OWS)

X BACnet Advanced Operator Workstation (B-AWS)

X BACnet Operator Display (B-OD)

X BACnet Building Controller (B-BC)

√ BACnet Advanced Application Controller (B-AAC)

X BACnet Application Specific Controller (B-ASC)

X BACnet Smart Sensor (B-SS)

X BACnet Smart Actuator (B-SA)

List all BACnet Interoperability Building Blocks Supported (Annex K)

DS-RP-B, DS-COV-B, DM-DDB-B, DM-DOB-B

Segmentation Capability

X Able to transmit segmented messages

X Able to receive segmented messages

Standard Object Types Supported

√ Binary Input

√ BitString (Fire, Evacuate, Alert, Pre-alarm, Security, Fault, Disablement, Technical)

Data Link Layer Options

√ BACnet IP, (Annex J)

√ BACnet IP, (Annex J), Foreign Device

X ISO 8802-3, Ethernet (Clause 7)

X ATA 878.1, 2.5 Mb. ARCNET (Clause 8)

X ATA 878.1, EIA-485 ARCNET (Clause 8), baud rate(s) _____

X MS/TP master (Clause 9), baud rate(s):

X MS/TP slave (Clause 9), baud rate(s):

X Point-To-Point, EIA 232 (Clause 10), baud rate(s):

X Point-To-Point, modem, (Clause 10), baud rate(s):

X LonTalk, (Clause 11), medium: _____

X BACnet/ZigBee (ANNEX O)

Device Address Binding

Is static device binding supported? (This is currently necessary for two-way communication with MS/TP slaves and certain other devices.) **X**

Networking Options

√ Router, Clause 6 - List all routing configurations, e.g., ARCNET-Ethernet, Ethernet-MS/TP, etc.

X Annex H, BACnet Tunneling Router over IP

√ BACnet/IP Broadcast Management Device (BBMD)

Does the BBMD support registrations by Foreign Devices?**X**

Does the BBMD support network address translation?**X**

Network Security Options

√ Non-secure Device - is capable of operating without BACnet Network Security

X Secure Device - is capable of using BACnet Network Security (NS-SD BIBB)

X Multiple Application-Specific Keys:

X Supports encryption (NS-ED BIBB)

X Key Server (NS-KS BIBB)

Character Sets Supported

Indicating support for multiple character sets does not imply that they can all be supported simultaneously.

√ ISO 10646 (UTF-8)   **X** IBM[c]/Microsoft[c] DBCS   **X** ISO 8859-1

X ISO 10646 (UCS-2)   **X** ISO 10646 (UCS-4)   **X** JIS X 0208

If this product is a communication gateway, describe the types of non-BACnet equipment/networks(s) that the gateway supports:

Fire alarm systems, Intruder alarm systems, CCTV systems.

Object ID Schematic

Nibble	1/2 5			4				3				2			1				0		
Bit	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Panel	Not used						Panel 0 - 127						0x3ff								
Zone	Zone (0-2000)												0x3fe								
Device	Panel (0-127)						(Loop 0-16)				Device (0-255)								Sub-address (0-6)		

Spectrex™ SharpEye™ 40/40C and D Series Flame Detectors

Modbus® Manager Manual

Technical support

To get technical support for this product, contact your local Emerson representative or the Emerson Technical Support department at +1 866 347 3427 or safety.csc@emerson.com.

Abbreviations and acronyms

Abbreviation or acronym	Definition
ATEX	Atmospheric explosives

Abbreviation or acronym	Definition
AWG	American wire gauge
BIT	Built-in test
EMC	Electromagnetic compatibility
EOL	End of line
FOV	Field of view
HART®	Highway addressable remote transducer - communication protocol
IAD	Immune at any distance
IECEx	International Electrotechnical Commission Explosion
IPA	Isopropyl alcohol
IR	Infrared
JP5	Type of jet fuel
Latching	Refers to relays remaining in the ON state even after the ON condition has been removed.
LED	Light emitting diode
LPG	Liquified petroleum gas
mA	Milliamps (0.001 amps)
Modbus®	Master-slave messaging structure
N/A	Not applicable
NFPA	National Fire Protection Association
NPT	National pipe thread
RS485	Communication protocol allowing bi-directional communication
PN	Part number
SIL	Safety integrity level
UNC	Unified coarse thread
Vac	Volts alternating current
Vdc	Volts direct current

Contents

1   Introduction

1.1   Product overview

Modbus® Manager is a customized software based on Modbus protocol over RS485, used to configure the device to suit the customer needs, perform firmware upgrades and provide troubleshooting information and functionality.

This guide describes the Modbus Manager and provides instructions on how to install, operate, and maintain the software.

Note
The Modbus Manager software is for use with Spectrex SharpEye™ 40/40C and 40/40D models only.

1.2   Minimum requirements

The minimum requirements for operating Modbus® Manager are as follows:

- Pentium® 3GHz

- Microsoft® Windows™ XP, 7, 8, or 10

- 2GB RAM

- 10GB hard disk free space

- Isolated RS-485 interface card to be defined as COM or an RS-485 converter to connect to a standard COM port

2   Initial setup

2.1   Download software

To download the Modbus® Manager, follow these steps:

Procedure

1. Go to Spectrex.net.
2. Using the site navigation, go to the relevant product page
3. Scroll down to *Documents and Drawings*.
4. Click **SOFTWARE DOWNLOADS & DRIVERS**.
5. Download the relevant file.

2.2   Running the software

Once the software file has been downloaded to your computer, create a shortcut in a convenient location.

To run the software, double click on the executable file.

2.3   Connect computer to the device

Prerequisites

The computer must first be connected to the device using the RS485 harness cable before performing any configuration or diagnostic operations on the device.

Procedure

1. Connect one end of the USB cable to one of the computer's USB ports.
2. Connect the other end of the USB cable to the USB serial (RS-485) adapter.
3. Connect the serial port of the adapter to the harness cable.

2.4   Connect device to harness cable

Procedure

1. Connect one side of the cable to detector Terminal 13 for RS-485 (+).
2. Connect the other side of the cable to detector Terminal 14 for RS-485 (-).

2.5   Set up USB adapter

> **⚠ CAUTION**

Check that the D-connector adapter wiring is similar to the wiring shown (if not, adjust the cable wiring to fit the desired adapter).

Procedure

1. If required, unscrew the cover of the USB adapter.
2. Set up jumpers using one of the following options.

   •

   •
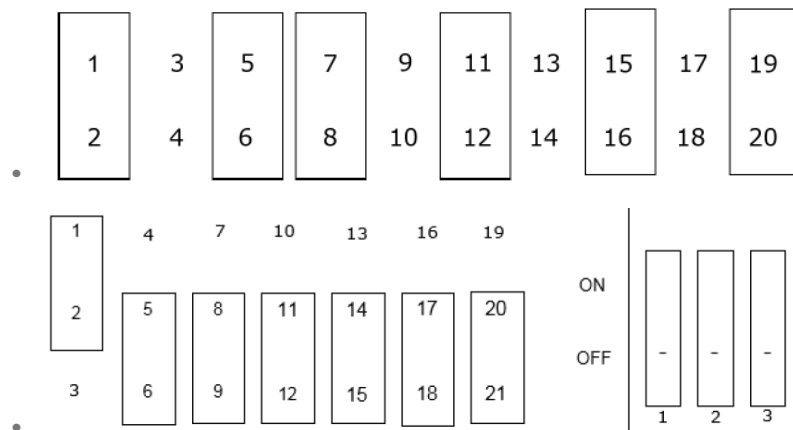
3. Close the USB adapter cover.
4. Connect the cable.

2.6   Establish the COM port

Prerequisites

When first connecting the harness, you will be prompted to select a COM port.

Procedure

1. Open Modbus® Manager.
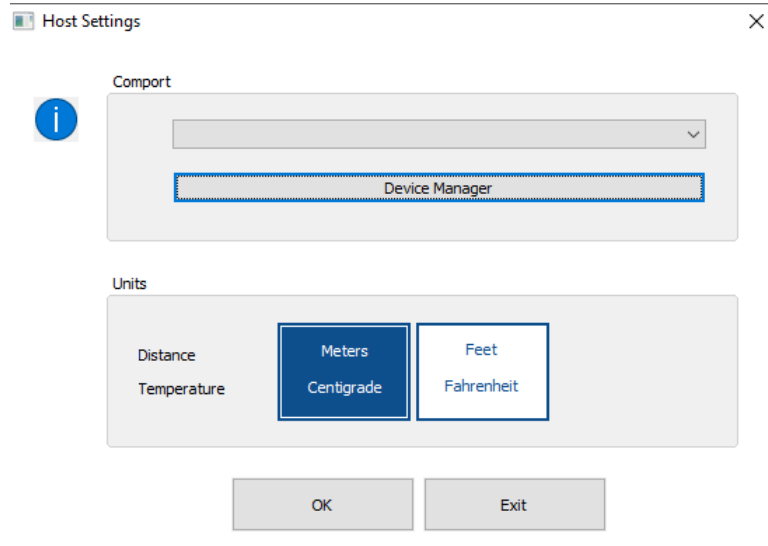
2. Select **Device Manager**.

3. Select **Ports**.

4. Note to which COM the *USB Serial Port* is connected (this will vary among computers).

5. From the **Comport** dropdown, select the relevant COM port.

6. Click the **OK** button.

2.7   Connecting the device

The device must be connected to power and the RS485 should be connected to the terminals according to the following table:

Function	Wire color	Terminal
RS485 (+)	Red	13
RS485 (-)	Black	14

3   Operation

3.1   Screen overview

Main screen

The left menu and top bar display on every screen. The left menu displays the brand name and navigation controls; the top bar displays device information.
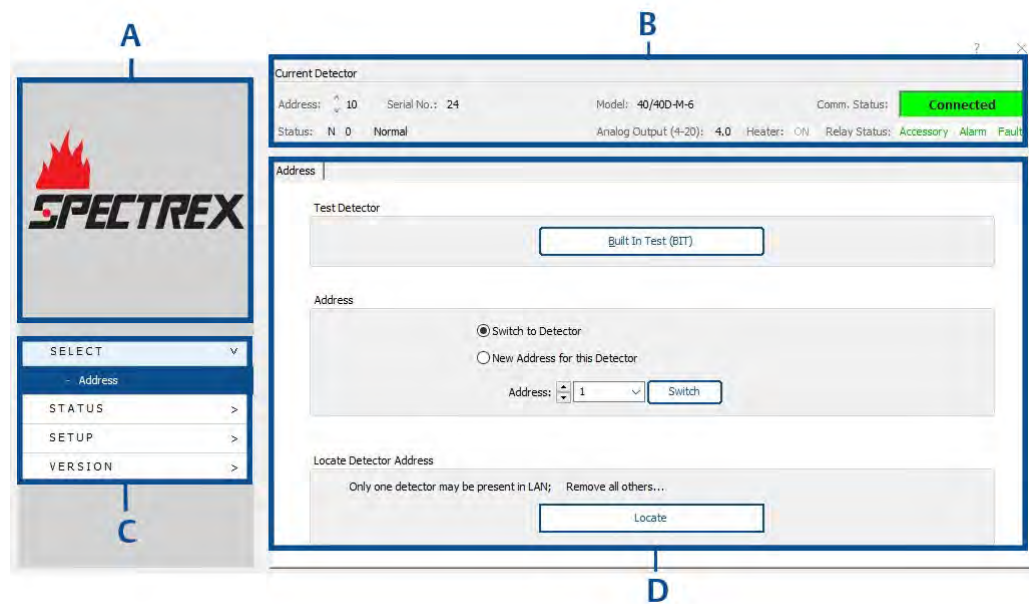
A. Device brand
B. Top bar (device information)
C. Left menu (navigation controls)
D. Settings and actions

Top bar

The top bar contains information about the connected detector and appears on every screen.
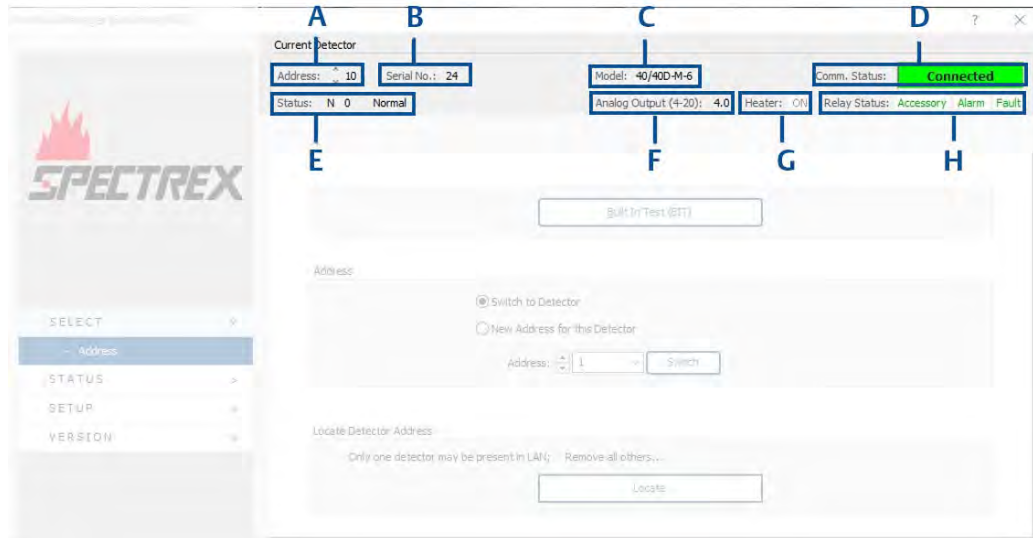
A. Current detector address
B. Detector serial number
C. Full detector model code
D. Communication status
E. Detector status
F. Analog output signal
G. Heater status
H. Relay status (green indicates de-energized state for alarm and ACC, energized for fault; red indicates energized state for alarm and ACC, de-energized for fault).

Left menu

The left menu contains navigation information and the main sections are viewed on each page. Subitems of the selected item are visible.
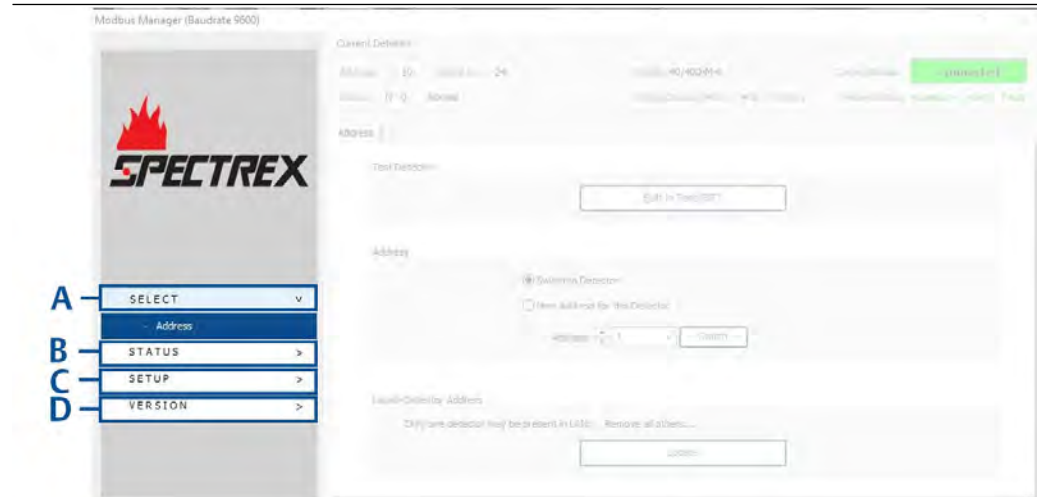
A. *Device information*
B. *Device status*
C. *Device setup*
D. *Device and software version*

3.2   Perform manual BIT

Procedure

In the *Test Detector* pane, click the **Built-In Test (BIT)** button.
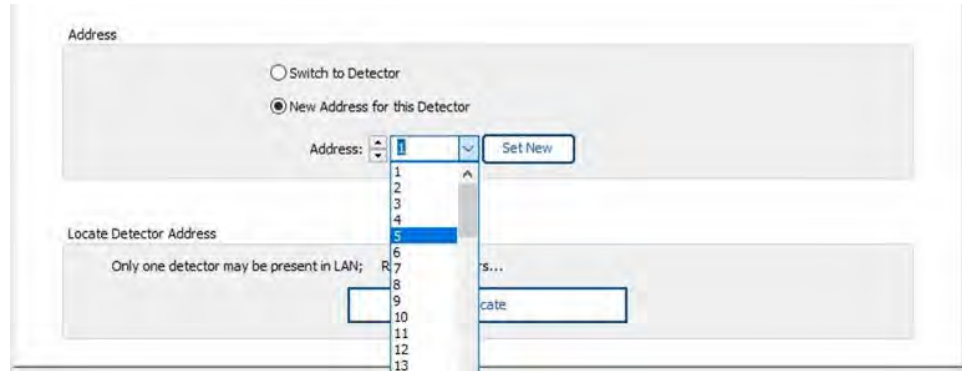
Note
Performing BIT sets field of view (FOV). If the detector is not mounted in its final position, BIT will need to be performed again.

3.3   Assign address to device

Procedure

1. In the *Address* pane, select the **New Address for the Detector** radio button.
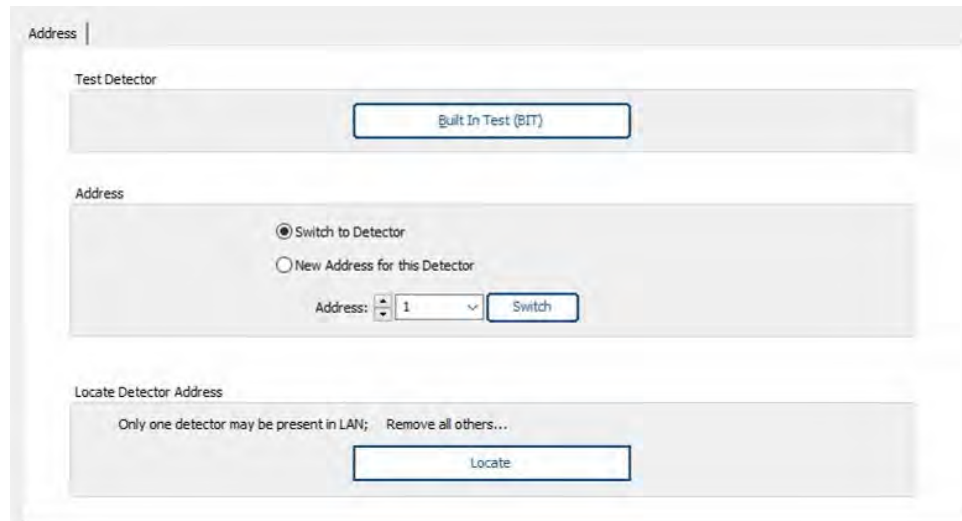
2. Use the *Address* dropdown to select the required address or enter the address in the dropdown text box.

3. Click the **Set New** button.

3.4   Switch device address

Procedure

1. In the *Address* pane, if more than one detector is in the network and its address is known, select the **Switch to Detector** radio button.

2. Use the *Address* dropdown to select the required address.

3. Click the **Switch** button.

Note
The detector address set by the factory is '1'. When locating the detector address, only one detector should be connected.

> **Note**
> Alternatively, the up and down arrows can be used to switch the address without clicking the **Switch** button.

3.5   Locating the detector address

If the detector address is not shown in the top menu or is not communicating, its address can be located by clicking the **Locate** button within the *Locate Detector Address* pane.

Once communication is established, the current detector address will be shown in the top menu.

> **Note**
> The *Locate* function requires that just a single detector be present in the RS485 LAN.

3.6   Status tab

This tab displays the device status for the currently selected detector.

A. *Shows current input voltage (in volts)*
B. *Shows current internal temperature (in degrees C or F according to setup)*
C. *Shows current 4-20 analog output (in mA)*
D. *Activates manual BIT*

3.7   Trend screen

This screen shows the input voltage, internal temperature, and analog output live trends according to the selected timeframe.
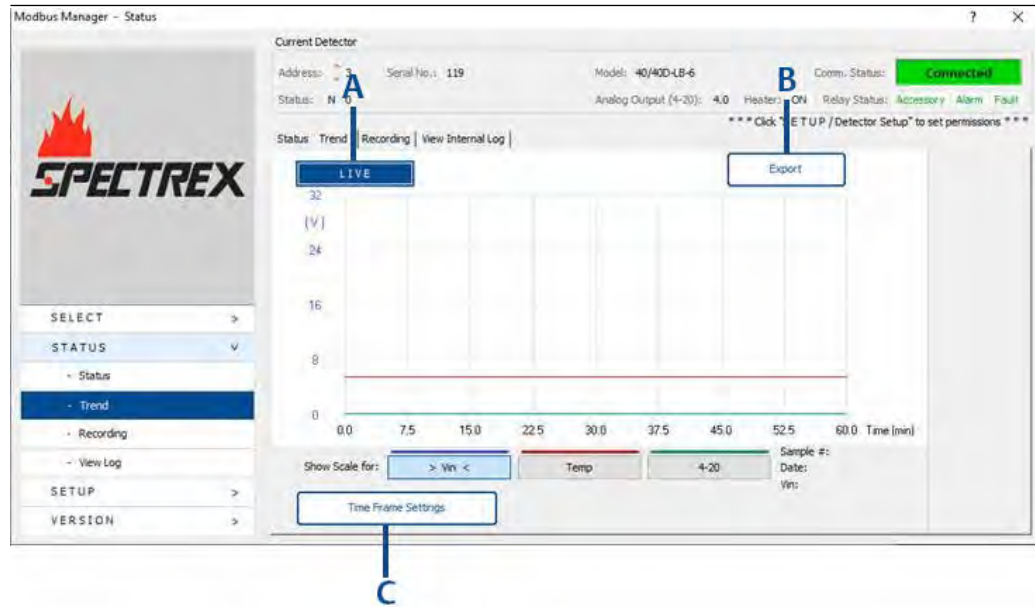
A. *Displays all recorded data according to timeframe settings*
B. *Exports all data as ".txt" file*
C. *Opens timeframe settings*

The timeframe settings can be adjusted by selecting the required values and clicking the **Reset** button.
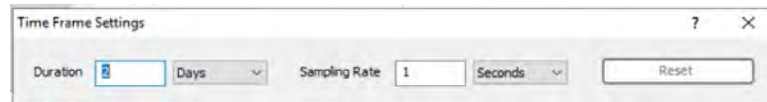
3.8 Recording screen

This screen allows data from detector currently connected to be recorded and exported into a ".txt" or ".xls" file.

3.8.1 Record data

Procedure

1. Select the required recording mode.
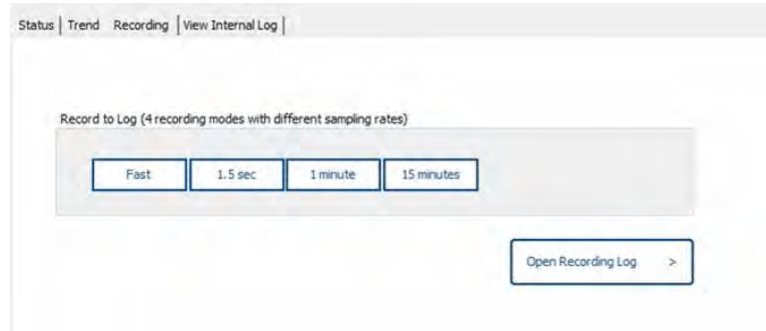
Note

The *Fast* mode provides recording at the best possible polling rate – around three records per second.

2. Enter a comment and click the **Insert** button.

3. To end the recording, click the **Stop** button.
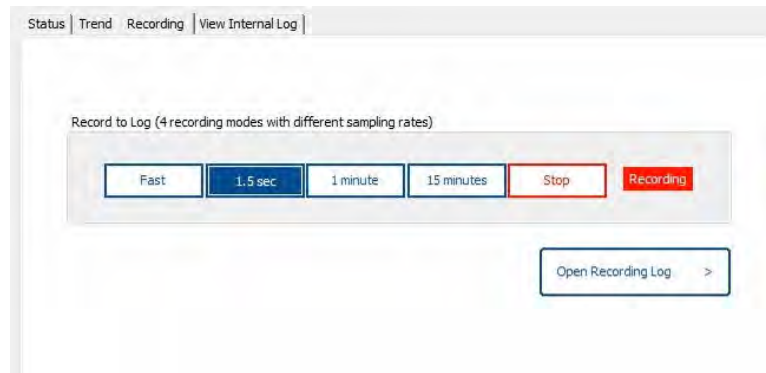
4. (Optional) Once recording has ended, click **Open Recording Log**.

Note

The file location is in the Modbus® directory installed on the computer in a file entitled "Recordings". SharpEye 40/40-I and M file names are *QuadIRlog_YMDHMS* (Year, Month, Date, Hours, Minute, Second). SharpEye 40/40-LB and L4B file names are prefaced with *UVIRlog_YMDHMS* (Year, Month, Date, Hours, Minute, Second).

The time stamp is according to GMT.

3.8.2 View internal log

The log displays the 12 most recent records without scrolling.

Procedure

To adjust number of records shown, change the number in the *Get* field and then press the
Get button.

A. *Displays records according to selection in the* **records up to current position** *field*
B. *Scrolls up by page*
C. *Scrolls down by page*
D. *Scrolls up by line*
E. *Re-read by line*
F. *Select which records will be displayed when clicking* **Get** *button*
G. *Opens selected number of most recent records in ".txt" format*

3.9 Detector setup tab

The detector is setup using the *Detector Setup* screen, in which configurable options, BIT
settings, Accessory Relay Options, Detection Options, Lock Option, and 4-20 Settings can
be changed.

Note
4-20mA settings – for fault mode, the default indication is 1mA, but may be changed to
0mA. A 4-20mA mode of 0mA is incompatible with HART® communication.
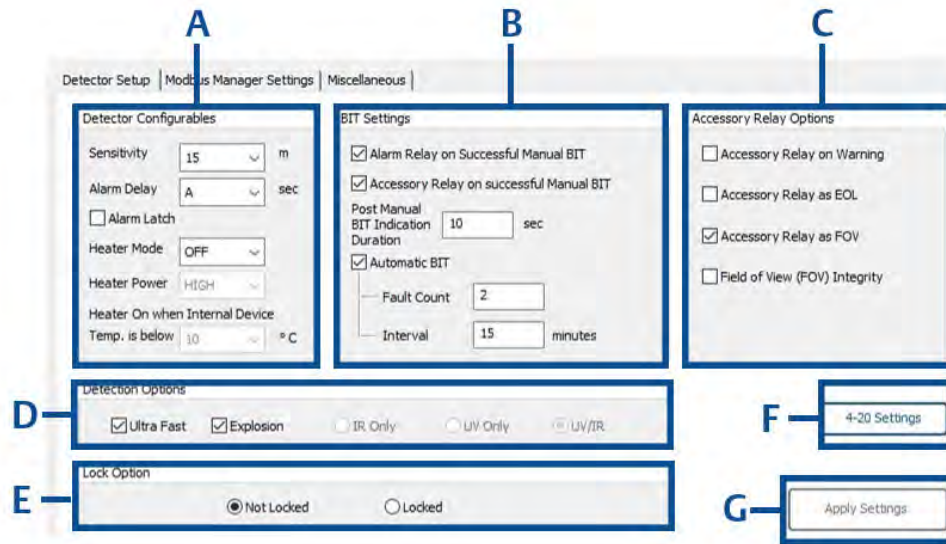
A. *Detector configurable settings*
B. *BIT settings*
C. *Accessory relay options*
D. *Detection options*
E. *Lock option*
F. *4-20 settings*
G. *Click to save any changes made, becomes clickable once any setting has been changed*

Note
Any unavailable options will be grayed out depending on specific detector model connected.

3.9.1   Detector configurable settings

These detector parameters may be configured.

Sensitivity	Sets the detector's sensitivity (in meters/feet). A higher number indicates greater sensitivity. See relevant product manual for more information.
Heater mode	Demister settings for clearing condensation from the lens. Choose from *On*, *Off*, or *Auto*. Default: Auto
Alarm delay	The delay (in seconds) between detection of a signal and activation of the alarm. Choose from *0*, *3*, *5*, *10*, *20*, *30*, or *A* (anti-flare). Default: A
Heater power	Choose from high or low power (Spectrex 40/40D models only). Default: High power

Heater on temperature
: Temperature at which the demister is activated, if the heat mode is set to *Auto*.
Default: 5 °C

Enable alarm latch
: When selected, the alarm remains on even when the signal abates.
Default: Not enabled

3.9.2   BIT settings

These BIT settings may be configured.

Enable Automatic BIT
: When selected, the BIT runs automatically according to the settings.
Default: Enabled

Fault count
: Number of sequential BIT faults before BIT fault indication.
Default: 3

Interval (in minutes)
: Duration between BIT cycles (maximum 60).
Default: 15

Activate alarm on successful manual BIT
: Activates an alarm when a manual BIT is successfully completed.
Default: Not enabled

Activate accessory relay on successful manual BIT
: Activates the accessory relay when a manual BIT is successfully completed.
Default: Not enabled

Post manual BIT indication duration (in seconds)
: Enables the user to configure the alarm duration (maximum 60) after successful manual BIT.
Default: 3

3.9.3   Accessory relay options

These options may be changed as described.

Activate accessory relay on warning	When the detector's status is warning, the accessory relay is activated. Default: Not enabled
Accessory relay as EOL	When selected, the accessory relay is activated. Default: Not enabled
Accessory relay as FOV	When selected, the accessory relay is activated where FOV fault is detected.[1] Default: Not enabled
Field of view (FOV) integrity	When enabled, will generate a notification if the detector's FOV has changed by at least 15 degrees on the Y axis.[1] Default: Not enabled 15 – 90 degrees – notification after 120 minutes Above 90 degrees – notification after 20 minutes

Note
The FOV Integrity is monitored through all outputs:

- Device status (Modbus® and HART® protocols)

- Stepped 4-20mA—assign specific values (i.e. 3, 4, or 5mA) to indicate the change

- Accessory relay—select the accessory relay activation for FOV integrity change

Important
The FOV integrity should be enabled after the detector is installed and its positioning is finalized.

3.9.4   Detection options

The type of detection can be determined using this section with the following parameters.[2]

Fast	According to model specifications, found in datasheet
Explosion	According to model specifications, found in datasheet
IR only	Single channel selection
UV only	Single channel selection
UV/IR	Double channel selection

---

(1) *Available with Spectrex 40/40D models only.*
(2) *Available with Spectrex 40/40D models only.*

3.9.5   Lock option

Modbus® Manager offers password protection for various maintenance and administrative actions.

Not locked	No password required to change detector settings or perform BIT
Locked	Password required to change detector settings; opens dialog box for setting passwords
Change passwords	To change the password, the previous password must be entered. If you do not have the previous password, contact the manufacturer to receive a time-limited password to reset the password. Once received, use the **Enable Password reset** button in the **Version → Service** menu.

When the "locked" option is selected, access to selected actions is controlled. There are two independent permission types that allow access to the actions listed in Table 3-1 once the detector is locked by passwords. When selecting the "locked" option, a dialog box opens to enter the maintenance and admin passwords. Both passwords must be entered by authorized personnel to complete the password setting process. Once completed, only share the relevant password in accordance with internal policy.

Table 3-1: Permission Types

Action	Permissions	
	Maintenance	**Admin**
Reset detector	Yes	Yes
Change password	Authorized personnel only	
Manual BIT	Yes	No
Detector setup	No	Yes
Firmware update	No	Yes
Fix 4-20 scale values	No	Yes
Parameter upload	No	Yes

Important
Once locked, the actions can be activated only when entering the correct password. The manufacturer will provide a time-limited password on authorized demand within five business days.

3.9.6   4-20 Settings

Clicking the *4-20 Settings* button opens a window showing current 4-20 settings. These settings can be customized in accordance with the allowed nominal values.

Fault	0 or 1mA (if 0 is selected there will be no HART® communication)
	Default: 1mA
BIT fault	Fixed value, cannot be changed
FOV warning	3 – 5mA (must be ≤ the normal value)[3]

	Default: 4mA
Normal	4 or 5mA (must be ≥ the FOV value)
	Default: 4mA
Pre-alarm warning	13 – 16mA (must be lower than alarm value)
	Default: 16mA
Alarm	15 – 20mA (must be higher than warning)
	Default: 20mA
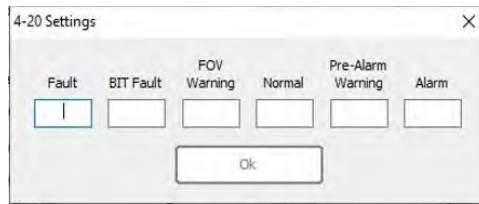
Once values are entered, click the **OK** button to update the setup.

Note

The setup is only saved upon closing the *4-20 Settings* dialog and subsequent application of setup dialog.

3.9.7 Modbus® Manager settings

The *Modbus Manager Settings* screen is used to change COM port and the units throughout the software.

Comport

Use this section to change the COM port as described in Establish the COM port.

Units

Use this section to change the units (i.e. metric or imperial) in which all measurements are displayed.
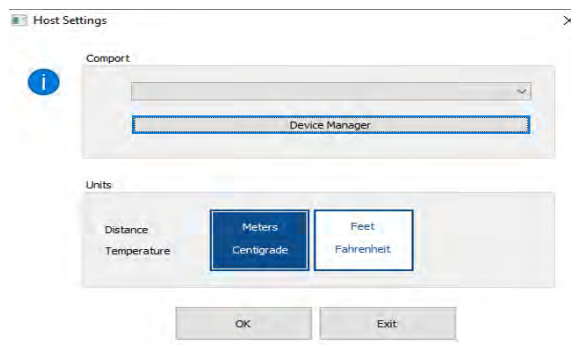
Note

The application automatically restarts when the COM port is changed.

---

(3) *Available with Spectrex 40/40D models only.*

4 Maintenance

4.1 Miscellaneous functions

This screen provides access to various maintenance functions.
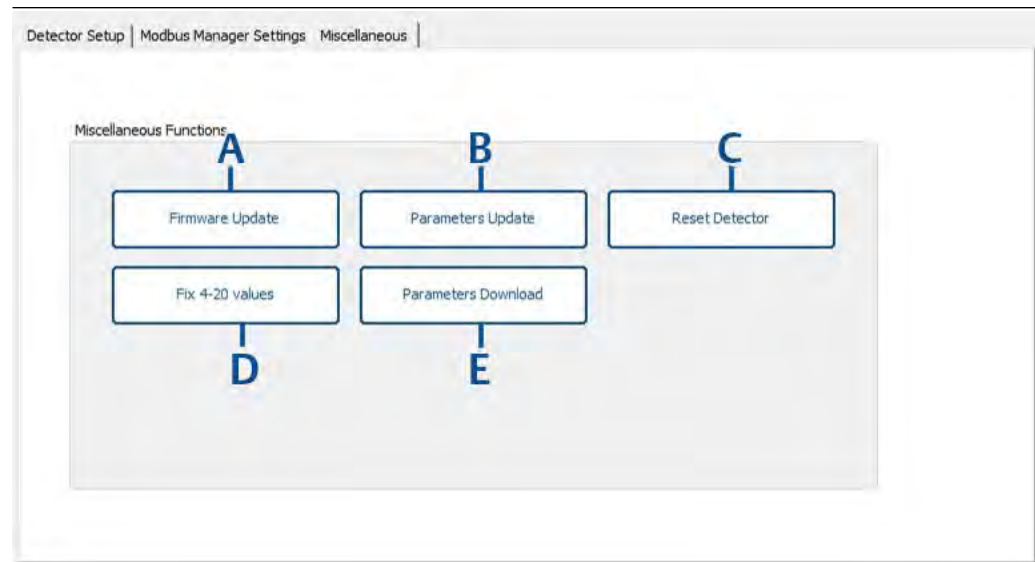
A. *Perform firmware update with provided file*
B. *Upload parameters file*
C. *Detector reset*
D. *Fix 4-20 values*
E. *Download parameters file*

4.2 Update firmware

Prerequisites

Firmware update file will be provided.

Procedure

1. Save file to your computer.
2. Switch to the required baud rate.
3. Click the **Firmware update** button.
4. Follow on-screen instructions to complete the process.

4.3 Parameter update

There is an optional feature to upload device parameters file with extension ".upm".

Where required, this file will be provided by the manufacturer.

4.4   Set fixed current 4-20 values

4-20mA is factory calibrated with controlled and certified equipment; there is no need for additional calibration. This process allows fixing of multimeter values to 4mA and 20mA fixed values.

For different equipment used at the customer site over ±0.05mA, the 4-20mA output can be fixed to match the reading indicated on the customer's multimeter. The reading can be adjusted within ±0.05mA.
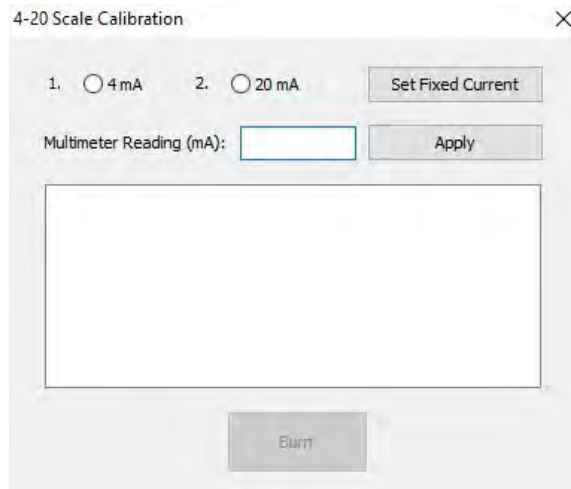
Procedure

1. Select the **4 mA** radio button

2. Click **Set fixed current**.

3. Enter multimeter reading.

4. Click the **Apply** button.

5. Repeat steps Step 3 and Step 4 until you enter value within 4mA ±0.05.

   Important
   It is essential to enter the final value and click **Apply**. If this process remains incomplete for five minutes, the detector will restart.

6. Select the **20 mA** radio button.

7. Click **Set fixed current**.

8. Enter multimeter reading.

9. Click the **Apply** button.

10. Repeat steps Step 8 and Step 9 until you enter value within 20mA ±0.5.

    Important
    It is essential to enter the final value and click **Apply**. If this process remains incomplete for five minutes, the detector will restart.

11. Click the **Burn** button to save the changes.

4.5 Parameter download

There is an optional feature to download device parameter files incorporated into one folder located in the Modbus® Manager directory. This folder is saved to the subfolder with the detector serial number included in the title.

Where required, this file will be provided by the manufacturer.

4.6 Version information

Detector information and the software version can be viewed on this screen.
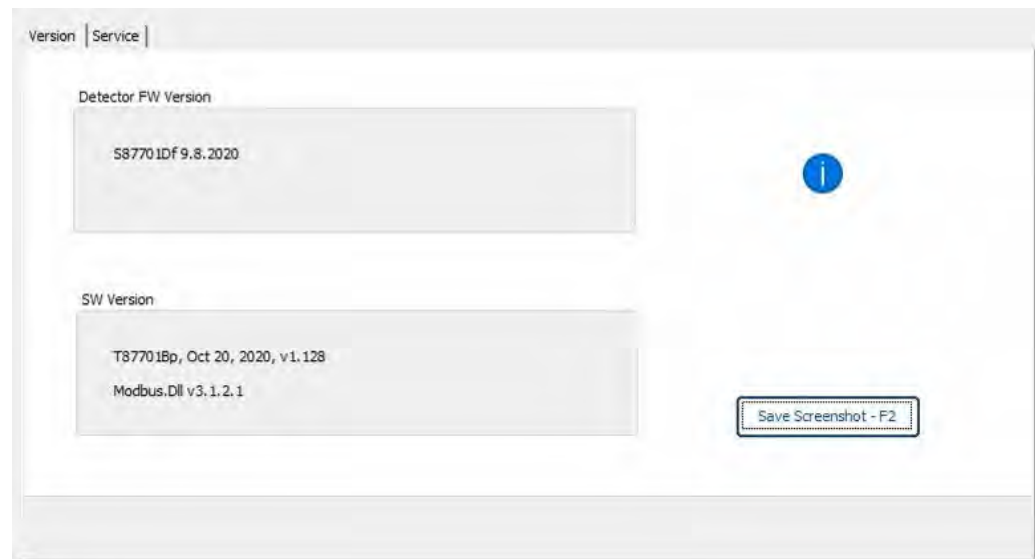
4.7 Service functions

This screen provides access to various service functions.
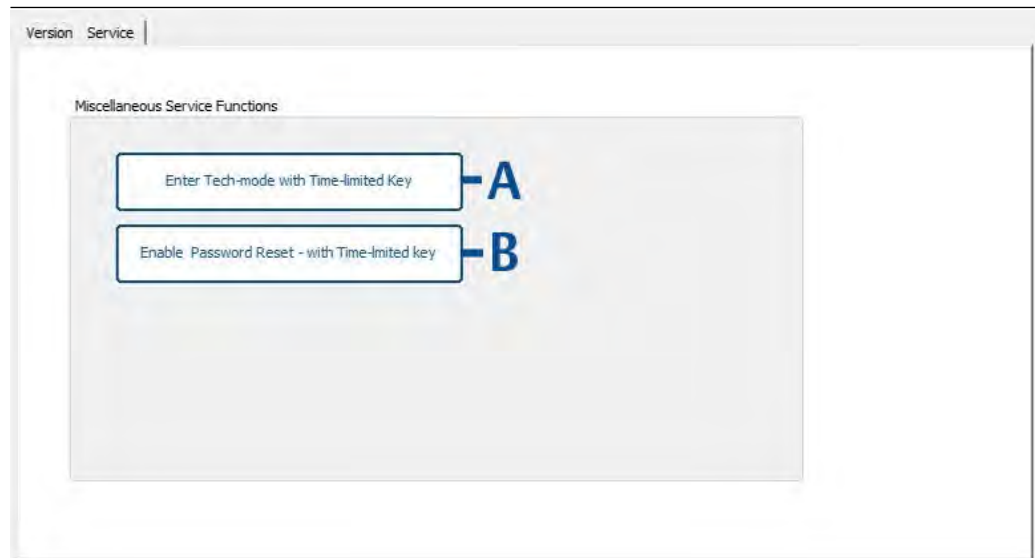
A. *Enter time-limited password received from the manufacturer to enter tech-mode.*
B. *Enter time-limited password received from the manufacturer to reset password.*

Note
If the application is closed after entering the password, a new password is required to re-enter tech mode or reset password.

A   Reference data

A.1   Ordering information, specifications, and dimensional drawings

To view current SharpEye 40/40 Series ordering information, specifications, and dimensional drawings, follow these steps:

Procedure

1. Go to Spectrex.net/en-us/flame-gas-detectors-flame-detectors-40-40-series.
2. Select the appropriate product.
3. Scroll down to *Documents and Drawings*.
4. Select **DATA SHEETS & BULLETINS**.
5. Select the appropriate Product Data Sheet.

A.2   Product certifications and installation drawings

To view current SharpEye 40/40 Series product certifications and installation drawings, follow these steps:

Procedure

1. Go to Spectrex.net/en-us/flame-gas-detectors-flame-detectors-40-40-series.
2. Select the appropriate product.
3. Scroll down to *Documents and Drawings*.
4. Select **CERTIFICATES & APPROVALS**.
5. Select the appropriate document.

A.3   Status codes

SharpEye 40/40 C-I, C-M, D-I, and D-M Models

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
S90	Start up	1mA	0v	Open	4Hz blinking orange	Every start-up
S91	Parameter restoration	1mA	0v	Open	4Hz blinking orange	After parameters burning

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
S92	Restore from wrong voltage	1mA	0v	Open	4Hz blinking orange	After wrong voltage
V81	Wrong 5 VOLT[1]	1mA	0v	Open	4Hz blinking orange	Every 30msec
V82	Wrong 9 VOLT[1]	1mA	0v	Open	4Hz blinking orange	Every 30msec
V83	Wrong vin[2]	1mA	0v	Open	4Hz blinking orange	Every 30msec
P71	Program memory CRC failure	1mA	0v	Open	4Hz blinking orange	At start-up
P72	Faulty parameters	1mA	0v	Open	4Hz blinking orange	At start-up or upon setup/ parameters burning
P74	RAM CRC failure	1mA	0v	Open	4Hz blinking orange	Every 30msec
P75	None of the parameters exist	1mA	0v	Open	4Hz blinking orange	At start-up
P76	RAM parameters CRC failure	1mA	0v	Open	4Hz blinking orange	Every hour
F31	Sensor 4.5μ circuit failure – no signal	1mA	0v	Open	4Hz blinking orange	Auto/manual BIT
F32	Sensor 5μ circuit failure – no signal	1mA	0v	Open	4Hz blinking orange	Auto/manual BIT
F33	Sensor 4μ, or 2.4μ for Hydrogen circuit failure – no signal	1mA	0v	Open	4Hz blinking orange	Auto/manual BIT
F34	Sensor 4.4μ, or 3μ for Hydrogen circuit failure – no signal	1mA	0v	Open	4Hz blinking orange	Auto/manual BIT
F38	Wrong AFE offset	1mA	0v	Open	4Hz blinking orange	Every 30msec

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
F46	IR signal Amp stuck at one failure	1mA	0v	Open	4Hz blinking orange	Every BIT
F47	Failure SPI COM with AFE	1mA	0v	Open	4Hz blinking orange	Every 30msec
F48	AFE stuck at 1	1mA	0v	Open	4Hz blinking orange	Every 30msec
F51	Sensor 4.5 noise	1mA	0v	Open	4Hz blinking orange	Every 30msec
F52	Sensor 5 noise	1mA	0v	Open	4Hz blinking orange	Every 30msec
F53	Sensor 4μ, or 2.4μ for Hydrogen noise	1mA	0v	Open	4Hz blinking orange	Every 30msec
F54	Sensor 4.4μ, or 2.4μ for Hydrogen noise	1mA	0v	Open	4Hz blinking orange	Every 30msec
F55	Sensor 4.5 and 5 short circuit	1mA	0v	Open	4Hz blinking orange	Every BIT
F56	Sensor 4.5 and 4 short circuit	1mA	0v	Open	4Hz blinking orange	Every BIT
F57	Sensor 4 and 5 short circuit	1mA	0v	Open	4Hz blinking orange	Every BIT
F58	Sensor 4.4 and 4.55 short circuit	1mA	0v	Open	4Hz blinking orange	Every BIT
F59	Sensor 4.4 and 4 short circuit	1mA	0v	Open	4Hz blinking orange	Every BIT
F60	Sensor 4.5 and 5 short circuit	1mA	0v	Open	4Hz blinking orange	Every BIT
N0	Normal	4mA	2v	Close	1Hz blinking green	Every 30msec
N1	Constant external BIT	4mA	2v	Close	4Hz blinking orange	Every 30msec

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
N2	Wrong ambient temperature	4mA	2v	Close	4Hz blinking orange	Every 30msec
N3	4-20mA circuit failure	0 mA	2v	Close	4Hz blinking orange	Every 30msec
N4	Fault relay failure	4mA	2v	Open	4Hz blinking orange	Every 30msec
N5	Accessory relay failure	4mA	2v	Open	4Hz blinking orange	Every 30msec
N6	Alarm relay failure	4mA	2v	Open	4Hz blinking orange	Every 30msec
N7	Heater failure	4mA	2v	Close	4Hz blinking orange	Every 30msec
N8	BIT failure	2mA	0v	Open	4Hz blinking orange	Every BIT
N9	Damaged BIT lamp	2mA	0v	Open	4Hz blinking orange	Every BIT
N11	FOV failure	4mA	2v	Close	1Hz blinking green	Every 30msec
N12	Missed ADC reading	4mA	2v	Close	1Hz blinking green	Every 30msec
N13	Analog output failure	4mA	0v	Close	4Hz blinking orange	Every 30msec
N18	FOV warning	4mA	2v	Close	1Hz blinking green	Every 30msec
B0	Automatic BIT	4mA	2v	Close	1Hz blinking green	Every BIT
M0	Manual BIT	4mA	2v	Close	1Hz blinking green[3]	Every BIT
E0	End of BIT	4mA	2v	Close	1Hz blinking green[3]	Every BIT

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
G0	Pre-alarm	4mA	2v	Close	1Hz blinking green	Every 30msec
T0	Alarm delay	16mA	2v	Close	2Hz blinking red	Every 30msec
W0	Warning	16mA	2v	Close	2Hz blinking red	Every 30msec
A0	Alarm	20mA	5v	Close	Constant red	Every 30msec
L0	Latch	20mA	5v	Close	Constant red	Every 30msec
Z0	Post-alarm: Benzene	4mA	2v	Close	1Hz blinking green	Every 30msec
J0	Anti-flare	(4)	2v	Close	1Hz blinking green	Every 30msec
X0	Explosion	20mA	5v	Close	Constant red	Every 0.23msec

(1) The detector turns to V81, V82 after two minutes.
(2) The detector turns to V83 after 50 seconds.
(3) Unless in Setup table define constant red.
(4) 4mA if from state "N", 16mA if from state "T".

SharpEye 40/40 -C-LB, C-L4B, D-LB, and D-L4B Models

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
S90	Start up	1mA	0v	Open	4Hz blinking orange	Every start-up
S91	Parameter restoration	1mA	0v	Open	4Hz blinking orange	After burning a new parameter
S92	Restore from wrong voltage	1mA	0v	Open	4Hz blinking orange	After wrong voltage
V81	Wrong 5 VOLT[1]	1mA	0v	Open	4Hz blinking orange	Every 30msec
V82	Wrong 9 VOLT[1]	1mA	0v	Open	4Hz blinking orange	Every 30msec

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
V83	Wrong vin[2]	1mA	0v	Open	4Hz blinking orange	Every 30msec
P71	Program memory CRC failure	1mA	0v	Open	4Hz blinking orange	At start-up
P72	Faulty parameters	1mA	0v	Open	4Hz blinking orange	At start-up or upon setup/ parameters burning
P74	RAM CRC failure	1mA	0v	Open	4Hz blinking orange	Every 30msec
P75	None of the parameters exist	1mA	0v	Open	4Hz blinking orange	At start-up
P76	RAM parameters CRC failure	1mA	0v	Open	4Hz blinking orange	Every hour
F38	Wrong AFE offset	1mA	0v	Open	4Hz blinking orange	Every 30msec
F41	Constant UV	1mA	0v	Open	4Hz blinking orange	Every 30msec
F42	Noisy UV	1mA	0v	Open	4Hz blinking orange	Every 30msec
F43	UV high voltage failure	1mA	0v	Open	4Hz blinking orange	Every 30msec
F44	IR sensor failure – no signal	1mA	0v	Open	4Hz blinking orange	Auto/manual BIT
F45	IR circuit shortcut failure	1mA	0v	Open	4Hz blinking orange	Every 30msec
F46	IR signal Amp stuck at one failure	1mA	0v	Open	4Hz blinking orange	Auto/manual BIT
F47	Constant IR signal	1mA	0v	Open	4Hz blinking orange	Every 30msec

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
F48	UV pulse stuck at 1	1mA	0v	Open	4Hz blinking orange	Every 30msec
F49	Digi pot failure	1mA	0v	Open	4Hz blinking orange	Every 30msec
F51	UV tube broken/ constant UV pulse	1mA	0v	Open	4Hz blinking orange	Every 30msec
F52	AFE (Analog Front End) failure	1mA	0v	Open	4Hz blinking orange	Every 30msec
F53	Bad SPI COM	1mA	0v	Open	4Hz blinking orange	Every 30msec
N0	Normal	4mA	2v	Close	1Hz blinking green	Every 30msec
N1	Constant external BIT	4mA	2v	Close	4Hz blinking orange	Every 30msec
N2	Wrong ambient temperature	4mA	2v	Close	4Hz blinking orange	Every 30msec
N3	4-20mA circuit failure	0 mA	2v	Close	4Hz blinking orange	Every 30msec
N4	Fault relay failure	4mA	2v	Open	4Hz blinking orange	Every 30msec
N5	Accessory relay failure	4mA	2v	Open	4Hz blinking orange	Every 30msec
N6	Alarm relay failure	4mA	2v	Open	4Hz blinking orange	Every 30msec
N7	Heater failure	4mA	2v	Close	4Hz blinking orange	Every 30msec
N8	IR or UV BIT failure	2mA	0v	Open	4Hz blinking orange	Every BIT
N9	Lamp BIT failure	2mA	0v	Open	4Hz blinking orange	Every BIT

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
N10	UV LED failure	3mA	0v	Open	4Hz blinking orange	Every BIT
N11	FOV failure	4mA	2v	Close	1Hz blinking green	Every 30msec
N12	Missed ADC reading	4mA	2v	Close	1Hz blinking green	Every 30msec
N13	Analog output failure	4mA	0v	Close	4Hz blinking orange	Every 30msec
N18	FOV warning	4mA	2v	Close	1Hz blinking green	Every 30msec
I0	IR level	8mA	2v	Close	1Hz blinking green	Every 30msec
U0	UV level	12mA	2v	Close	1Hz blinking green	Every 30msec
B0	IR/UV automatic BIT	4mA	2v	Close	1Hz blinking green	Every IR BIT
M0	IR/UV manual BIT	4mA	2v	Close	1Hz blinking green[3]	Every IR BIT
E0	IR/UV end of BIT	4mA	2v	Close	1Hz blinking green[3]	Every IR BIT
G0	Temperature gradient	4mA	2v	Close	1Hz blinking green	Every 30msec
T0	Alarm delay	16mA	2v	Close	2Hz blinking red	Every 30msec
W0	Warning	16mA	2v	Close	2Hz blinking red	Every 30msec
A0	Alarm	20mA	5v	Close	Constant red	Every 30msec
L0	Latch	20mA	5v	Close	Constant red	Every 30msec
Z0	Benzene	4mA	2v	Close	1Hz blinking green	Every 30msec

Status	Description	4-20mA output	Analog output	Fault relay	LED indicator	Test rate
J0	Anti-flare	(4)	2v	Close	1Hz blinking green	Every 30msec
X0	Explosion	20mA	5v	Close	Constant red	Every 0.23msec

B   Configurable options

B.1   SharpEye 40/40C options

This section contains values for configurable options. Asterisks (*) indicate default values unless otherwise noted.

Option	SharpEye model			
	40/40C-I	**40/40C-M**	**40/40C-LB**	**40/40C-L4B**
Detection sensitivity	• 3m • 15m • 30m* • 45m • 65m		• 3m • 15m*	• 3m • 15m • 28m*
Alarm delay (in seconds)	• 0 • A (Anti-flare)* • 3 • 5 • 10 • 15 • 20 • 30			
Alarm latching	• Yes • No*			
Heated optics	• Constantly on • Constantly off • Auto on: 32 °F (0 °C) • Auto on: 41 °F (5 °C)* • Auto on: 50 °F (10 °C) • Auto on: 59 °F (15 °C) • Auto on: 68 °F (20 °C) • Auto on: 77 °F (25 °C) • Auto on: 86 °F (30 °C)			
Heated power	• Low • High*			

Option	SharpEye model			
	40/40C-I	**40/40C-M**	**40/40C-LB**	**40/40C-L4B**
Alarm relay on successful manual BIT	• Yes • No*			
Accessory relay on successful manual BIT	• Yes • No*			
Post manual BIT indication duration (in seconds)	3–60 Default value: 3			
Enable automatic BIT	• Yes* • No			
Fault count	0–10 Default value: 3			
Bit interval (in minutes)	1–60 Default value: 15			
Accessory relay options	• Disabled* • Accessory relay on warning • Accessory relay as EOL			
Lock option	• Not locked* • Locked			
4-20mA settings				
Fault	• 0 • 1*			
BIT fault	2*			
Normal	• 4* • 5			
Warning	• 16* • Custom			
Alarm	• 20* • Custom			

B.2   SharpEye 40/40D options

This section contains values for configurable options. Asterisks (*) indicate default values unless otherwise noted.

Option	SharpEye model			
	40/40D-I	**40/40D-M**	**40/40D-LB**	**40/40D-L4B**
Detection sensitivity	• 3m • 15m • 30m* • 45m • 65m • 90m		• 3m • 15m • 28m*	
Alarm delay (in seconds)	• 0 • A (Anti-flare)* • 3 • 5 • 10 • 15 • 20 • 30			
Alarm latching	• Yes • No*			
Heated optics	• Constantly on • Constantly off • Auto on: 32 °F (0 °C) • Auto on: 41 °F (5 °C)* • Auto on: 50 °F (10 °C) • Auto on: 59 °F (15 °C) • Auto on: 68 °F (20 °C) • Auto on: 77 °F (25 °C) • Auto on: 86 °F (30 °C)			
Heated power	• Low • High*			
Alarm relay on successful manual BIT	• Yes • No*			

Option	SharpEye model			
	40/40D-I	**40/40D-M**	**40/40D-LB**	**40/40D-L4B**
Accessory relay on successful manual BIT	• Yes • No*			
Post manual BIT indication duration (in seconds)	3–60 Default value: 3			
Enable automatic BIT	• Yes* • No			
Fault count	0–10 Default value: 3			
Bit interval (in minutes)	1–60 Default value: 15			
Detection options	• Standard* • Fast • Explosion		• Standard* • Fast • Explosion • IR only • UV only • UV/IR*	
Accessory relay options	• Disabled* • Accessory relay on warning • Accessory relay as EOL • Accessory relay as FOV • FOV integrity			
Lock option	• Not locked* • Locked			
4-20mA settings				
Fault	• 0 • 1*			
BIT fault	2*			
Normal	• 4* • 5			
Warning	• 16* • Custom			
Alarm	• 20* • Custom			

Option	SharpEye model			
	40/40D-I	**40/40D-M**	**40/40D-LB**	**40/40D-L4B**
FOV	• 3 • 4* • 5			

SPECTREX

Spectrex SharpEye™ 40/40C and 40/40D Series

Flame Detectors

Warranty

1. <u>Limited Warranty</u> . Subject to the limitations contained in Section 2 (Limitation of Remedy and Liability) herein, Seller warrants that (a) the licensed firmware embodied in the Goods will execute the programming instructions provided by Seller; (b) that the Goods manufactured by Seller will be free from defects in materials or workmanship under normal use and care; and (c) Services will be performed by trained personnel using proper equipment and instrumentation for the particular Service provided. The foregoing warranties will apply until the expiration of the applicable warranty period.

   Sensors and detectors are warranted against defective parts and workmanship for 36 months for SharpEye 40/40C models and 60 months for SharpEye 40/40D models from the date of purchase.

   Products purchased by Seller from a third party for resale to Buyer (Resale Products) shall carry only the warranty extended by the original manufacturer. Buyer agrees that Seller has no liability for Resale Products beyond making a reasonable commercial effort to arrange for procurement and shipping of the Resale Products. If Buyer discovers any warranty defects and notifies Seller thereof in writing during the applicable warranty period, Seller shall, at its option, (i) correct any errors that are found by Seller in the firmware or Services; (ii) repair or replace FOB point of manufacture that portion of the Goods found by Seller to be defective; or (iii) refund the purchase price of the defective portion of the Goods/Services. All replacements or repairs necessitated by inadequate maintenance; normal wear and usage; unsuitable power sources or environmental conditions; accident; misuse; improper installation; modification; repair; use of unauthorized replacement parts; storage or handling; or any other cause not the fault of Seller, are not covered by this limited warranty and shall be replaced or repaired at Buyer's sole expense, and Seller shall not be obligated to pay any costs or charges incurred by Buyer or any other party except as may be agreed upon in writing in advance by Seller. All costs of dismantling, reinstallation, freight, and the time and expenses of Seller's personnel and representatives for site travel and diagnosis under this limited warranty clause shall be borne by Buyer unless accepted in writing by Seller. Goods repaired and parts replaced by Seller during the warranty period shall be in warranty for the remainder of the original warranty period or 90 days, whichever is longer. This limited warranty is the only warranty made by Seller and can be amended only in a writing signed by an authorized representative of Seller. The limited warranty herein ceases to be effective if Buyer fails to operate and use the Goods sold hereunder in a safe and reasonable manner and in accordance with any written instructions from the manufacturers. THE WARRANTIES AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE. THERE ARE NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESSED OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, OR ANY OTHER MATTER WITH RESPECT TO ANY OF THE GOODS OR SERVICES.

2. <u>Limitation of Remedy and Liability</u> SELLER SHALL NOT BE LIABLE FOR DAMAGES CAUSED BY DELAY IN PERFORMANCE. THE REMEDIES OF BUYER SET FORTH IN THE AGREEMENT ARE EXCLUSIVE. IN NO EVENT, REGARDLESS OF THE FORM OF THE CLAIM OR CAUSE OF ACTION (WHETHER BASED IN CONTRACT INFRINGEMENT, NEGLIGENCE, STRICT LIABILITY, OTHER TORT, OR OTHERWISE), SHALL SELLER'S LIABILITY TO BUYER AND/OR BUYER'S CUSTOMERS EXCEED THE PRICE TO BUYER OF THE SPECIFIC GOODS MANUFACTURED OR SERVICES PROVIDED BY SELLER GIVING RISE TO THE CLAIM OR CAUSE OF ACTION. BUYER AGREES THAT IN NO EVENT SHALL SELLER'S LIABILITY TO BUYER AND/OR BUYER'S CUSTOMERS EXTEND TO INCLUDE INCIDENTAL, CONSEQUENTIAL, OR PUNITIVE DAMAGES. THE TERM "CONSEQUENTIAL DAMAGES" SHALL INCLUDE, BUT NOT BE LIMITED TO, LOSS OF ANTICIPATED PROFITS, REVENUE OR USE AND COSTS INCURRED INCLUDING WITHOUT LIMITATION FOR CAPITAL, FUEL AND POWER, AND CLAIMS OF BUYER'S CUSTOMERS.

Technical support

To get technical support for this product, contact your local Rosemount representative or the Rosemount Technical Support department at +1 866 347 3427 or safety.csc@emerson.com

Abbreviations and acronyms

Abbreviation or acronym	Definition
ATEX	Atmospheric explosives

Abbreviation or acronym	Definition
AWG	American wire gauge
BIT	Built-in test
EMC	Electromagnetic compatibility
EOL	End of line
FOV	Field of view
HART®	Highway addressable remote transducer - communication protocol
IAD	Immune at any distance
IECEx	International Electrotechnical Commission Explosion
IPA	Isopropyl alcohol
IR	Infrared
JP5	Type of jet fuel
Latching	Refers to relays remaining in the ON state even after the ON condition has been removed.
LED	Light emitting diode
LPG	Liquified petroleum gas
mA	Milliamps (0.001 amps)
Modbus®	Master-slave messaging structure
N.C.	Normally closed
N.O.	Normally open
N/A	Not applicable
NFPA	National Fire Protection Association
NPT	National pipe thread
RS485	Communication protocol allowing bi-directional communication
PN	Part number
SIL	Safety integrity level
UNC	Unified coarse thread
Vac	Volts alternating current
Vdc	Volts direct current

Contents

1   Introduction

1.1   Product overview

The SharpEye 40/40 series is based on proven Spectrex technologies, including triple infrared (IR3) and ultraviolet infrared (UV/IR). The SharpEye 40/40 series features QuadSense™ technology, providing the fastest response to fire, longest distance detection, and revolutionary UV/IR technology, coupled with superior immunity to false alarms, functioning in harsh conditions with unparalleled reliability and durability.

The series is suited to meet the challenges of wide range of industrial and commercial applications with long distance and fast response detection, providing superior protection of high value property and personnel to keep a SharpEye on your safety.

Detection performance can be easily adapted to all environments, applications, and requirements, by changing the detector's configuration parameters. Adjusting these parameters, as well as performing other maintenance and monitoring tasks, is possible by means of RS-485-based Modbus® communication or HART® communication.

1.2   Models

The SharpEye 40/40 Flame Detectors are electro-optical devices designed to identify fire events, enabling alarm activation. The detectors are intended for indoor or outdoor use and can be used stand alone or connected to an alarm/automatic extinguishing system.

The SharpEye 40/40 series comprises the following detectors:

SharpEye 40/40C-I

The SharpEye 40/40C-I, a multispectrum Quad-sense™ flame detector, detects hydrocarbon fuel and gas fires with enhanced performance, advanced long distance detection of hydrocarbon fires, fast detection in under five seconds, and strengthened reliability. The SharpEye 40/40C-I is based on proven triple infrared (IR3) technology, ensuring high sensitivity with superior immunity to false alarms.

SharpEye 40/40C-M

The SharpEye 40/40C-M multispectrum Quad-sense IR flame detector is specifically designed for the detection of hydrocarbon and hydrogen flames with enhanced performance, advanced long distance detection of hydrogen and hydrocarbon fires, fast detection in under five seconds, and strengthened reliability. The SharpEye 40/40C-M is based on proven triple IR (IR3) technology, ensuring high sensitivity with superior immunity to false alarms.

SharpEye 40/40C-LB

The SharpEye 40/40C-LB is a dual spectrum ultraviolet (UV)/IR flame detector, designed to provide fast detection in under five seconds of a range of fires, such as hydrocarbon-based fuel and gas, hyrdoxyl, hydrogen, metal, and inorganic.

SharpEye 40/40C-L4B

The SharpEye 40/40C-L4B is a dual spectrum UV/IR flame detector designed to provide fast detection in under five seconds of hydrocarbon-based fuel and gas fires.

SharpEye 40/40D-I

The SharpEye 40/40D-I, an ultra-fast multispectrum Quad-sense IR3 flame detector, provides superior, longest distance detection of hydrocarbon fires at up to 295.3 ft (90 m), exceptional ultra-fast detection in under 50 msec, and unparalleled reliability. The SharpEye 40/40D-I is based on proven Triple IR (IR3) technology, ensuring highest sensitivity with best immunity to false alarms.

SharpEye 40/40D-M

The SharpEye 40/40D-M is a multispectrum Quad-sense IR flame detector that provides superior, longest distance detection of hydrogen (at up to 164.0 ft (50 m)) and hydrocarbon fires (at up to 295.3 ft (90 m)), exceptional ultra-fast detection in under 50 msec, and unparalleled reliability. The SharpEye 40/40D-M is designed to deal with the challenges of invisible fires based on proven IR3 technology, ensuring highest sensitivity with best immunity to false alarms.

SharpEye 40/40D-LB

The SharpEye 40/40D-LB is an ultra-fast UV/IR flame detector, which is able to detect in under 20 msec and features a unique dual sensor with selectable UV and IR channels that can be used separately or combined. The detector is designed to detect a range of fires, such as hydrocarbon-based fuel and gas, hydroxyl, hydrogen, metal, and inorganic.

SharpEye 40/40D-L4B

The SharpEye 40/40D-L4B is an ultra-fast UV/IR flame detector that is able to detect in under 20 msec, and features a unique dual sensor with selectable UV and IR channels that can be used separately or combined. The detector is designed to detect hydrocarbon-based fuel and gas fires.

Table 1-1: SharpEye 40/40 Series General Technical Specifications

Spectral response	Infrared and ultraviolet bands
Response time	Varies according to model, typically under 5 seconds
Field of view	Varies according to model, up to 100 degrees
Output	4-20 mA, relays, communication
Enclosure	Stainless steel 316 or aluminum polyurethane painted
Operating voltage	18-32 Vdc
Maximum power rating	9.6 W
Relay contacts	2A/30 Vdc
Over voltage category	2
Relative humidity	Non-condensing relative humidity up to 100%

⚠ **CAUTION**

If the product is used outside of specified limits, this voids the product certification, and our company is not responsible for any incurred warranty expense.

Do not open this product, except for the terminal compartment as listed in this document, under any circumstances.

The detector is not field-repairable. Any attempt to modify or repair the internal circuits or change their settings will impair the system's performance and void the product warranty.

Opening the attachment screws to dismantle the front part of the detector from remaining parts is restricted and voids the product warranty.

2   Installation

2.1   Installation guidelines

Installation should comply with the National Fire Protection Association (NFPA) 72E or any other local and international regulations and standards, as applicable to flame detectors and installation of Ex approved products. To ensure optimal performance and efficient installation, consider the following guidelines.

Sensitivity

To determine the level of sensitivity, consider the following:

- Size of fire at the required distance to be detected
- Type of flammable materials
- Proximity to false alarm sources

Wiring

The wire gauge must be designed according to the distance from the detector to the controller and the number of detectors on the same power line.

To fully comply with EMC directive and protect against interference caused by RFI and EMI, the cable to the detector must be shielded and the detector must be grounded. The shield should be grounded at the detector end.

Spacing and location

The number of detectors and their locations in the protected area are determined by:

- Size of the protected area
- Sensitivity of the detectors
- Obstructed lines of sight
- Cone of view of the detectors

Environment

Dust, snow, or rain can reduce the detector's sensitivity and require more maintenance activities.

The presence of high intensity emission sources may affect sensitivity.

2.2   Preparation for use

The installation sequence may vary according to the physical structure of the site.

Note

Installation steps are also detailed in the Quick Start Guide supplied with the detector.

The following tools are required for installation. These are standard tools and are not supplied with the detector.

Table 2-1: Required tools

Tool	Function
Hex key 1.5 mm	Fasten back cover security screw.
Hex key 6 mm	Adjust the tilt mount.
Hex key 10 mm	Affix the detector to the tilt mount.
Hex key ⅛-in	Attach protective cover to detector.
Flat screwdriver 6 mm	Connect ground terminal.
Flat screwdriver 2.5 mm	Connect wires to the terminal blocks.
Hex key ⅜-in	Stop plug ¾-in NPT.
Open wrench 28 mm	Stop plug M25 only.

2.2.1   Field of view

Figure 2-1: Horizontal field of view forSharpEye 40/40C-I, C-LB, C-L4B, D-I, D-LB, and D-L4B
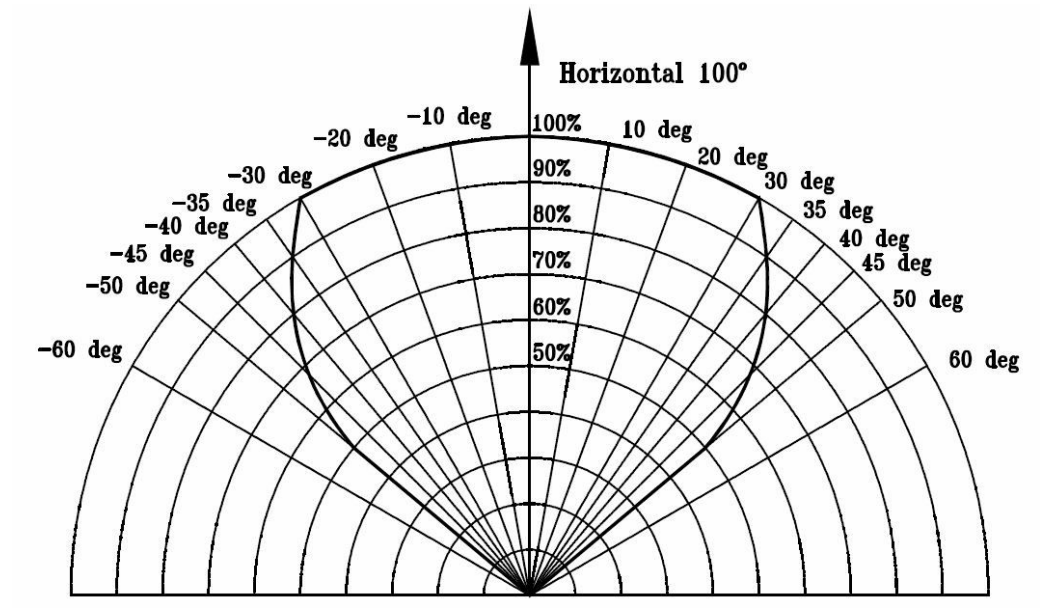
Figure 2-2: Vertical Field of View for SharpEye 40/40C-I, C-LB, C-L4B, D-I, D-LB, and D-L4B
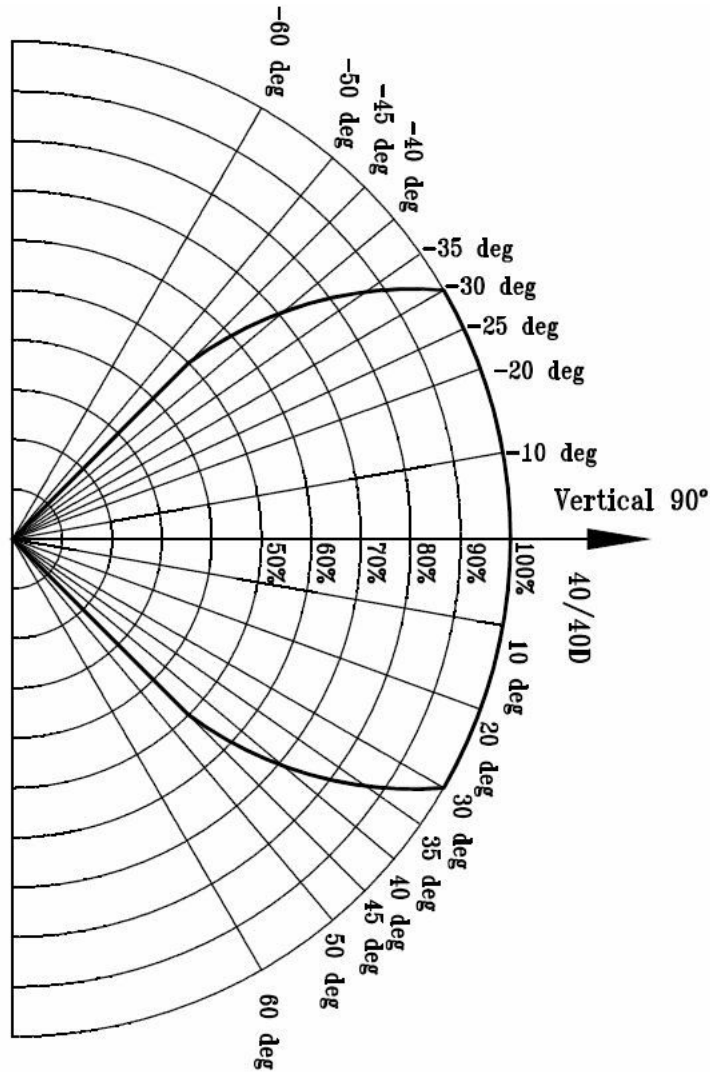
- +50 ° (down)
- -45 ° (up)

Gasoline

For SharpEye 40/40C-M and D-M

- Horizontal: 80 °
- Vertical: 80 °

Figure 2-3: Vertical and horizontal field of view for gasoline
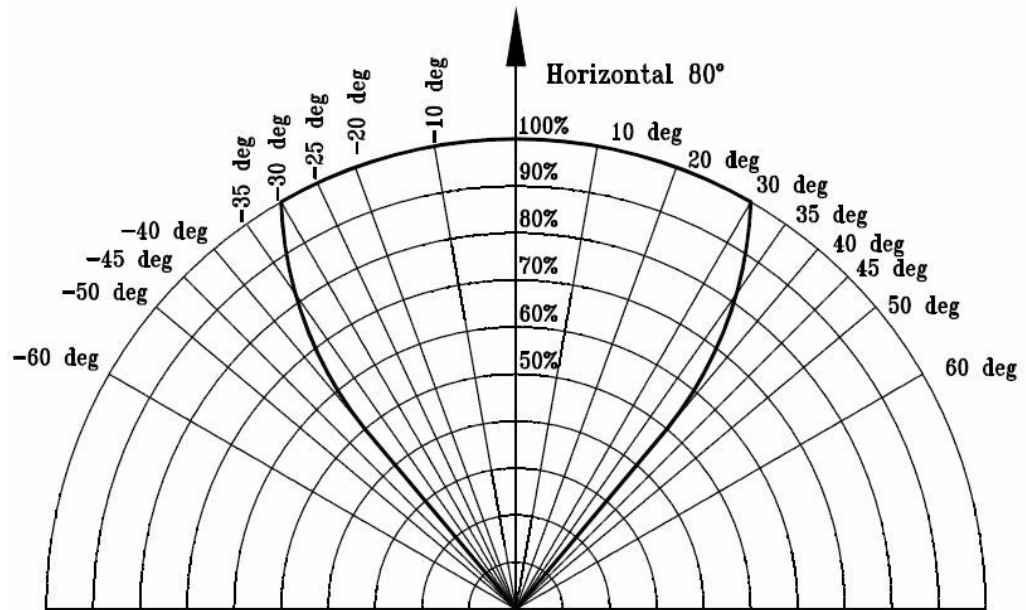
Hydrogen

For SharpEye 40/40C-M and D-M

- Horizontal: 90°

- Vertical: 90°

Figure 2-4: Horizontal field of view for hydrogen
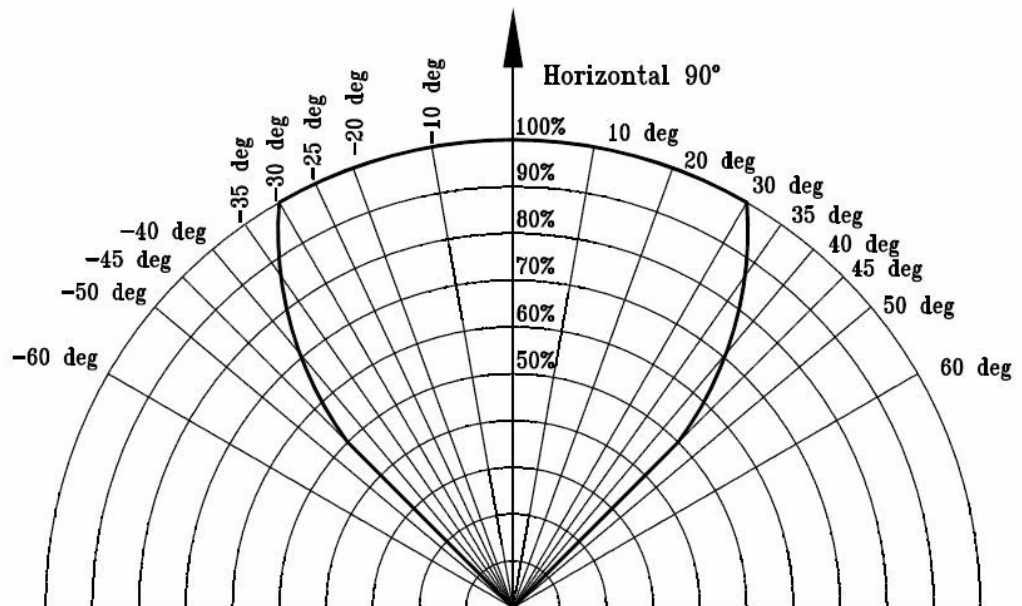
Figure 2-5: Vertical field of view for hydrogen
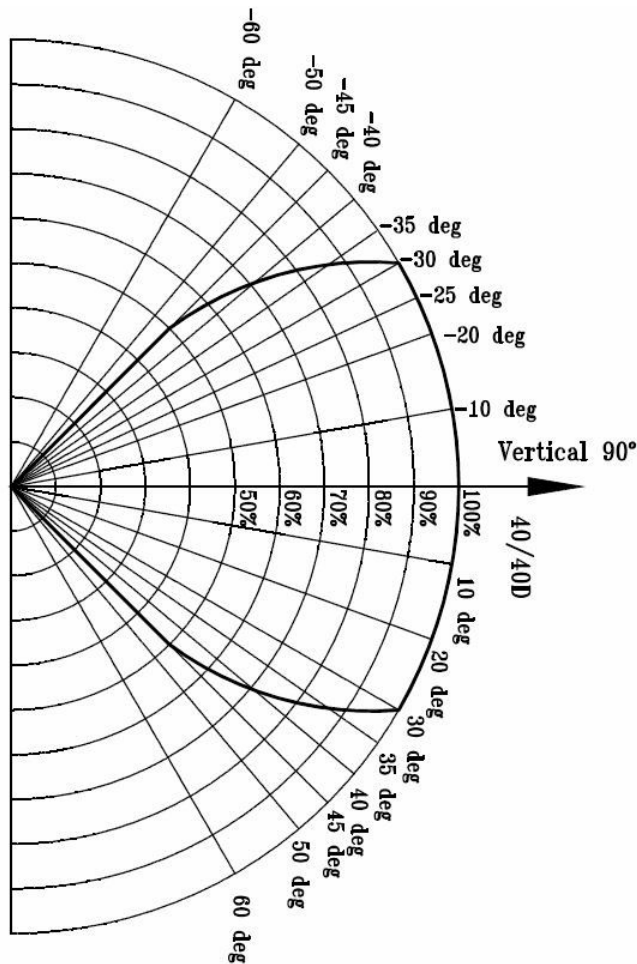
2.3   Attach detector to tilt mount

Procedure

1. Unpack the detector.
2. Insert location pins on the tilt mount into the openings on detector housing.

3. Thread the holding screw and tighten it.

> **Note**
> To change the detector field of view, release the horizontal and vertical locking screws.

4. Point the detector toward the protected area and ensure the view of the area is unobstructed.

5. Secure the detector in that position by tightening the locking screws on the tilt mount.
   The detector is now correctly located, aligned, and ready to be connected to the system.

2.4 Open the back cover

Procedure

1. Loosen the back cover security screw.

   A.   Back cover security screw
   B.   Protective plug

2. Unscrew the back cover.

> **Note**
> The back cover is attached by a security cable.

3. Remove the protective plug.

2.5 Wire terminals and ground cable

⚠ **CAUTION**

Improper wiring may damage the detector.

Procedure

1. Connect the terminals according to Table 2-2.
   The terminal details are also on the inside back cover.

Figure 2-6: Terminal box

Table 2-2: Terminal box

Terminal	Function
T1	24 Vdc (+)
T2	24 Vdc (-)
T3	External built-in test (BIT) switch
T4	Fault relay - normally open
T5	Fault relay
T6	Fault relay - normally closed
T7	Alarm relay - normally open
T8	Alarm relay
T9	Alarm relay - normally closed
T10	0-20 mA (+)
T11	0-20 mA (-)
T12	Alarm output (40/40D models)
T13	RS485 (+)
T14	RS485 (-)
T15	Accessory relay - normally open
T16	Accessory relay
T17	Accessory relay - normally closed

2. Use Figure 2-7, Figure 2-8, Figure 2-9, and Figure 2-10 for typical wiring configurations.

Figure 2-7: Typical wiring for four-wire controllers
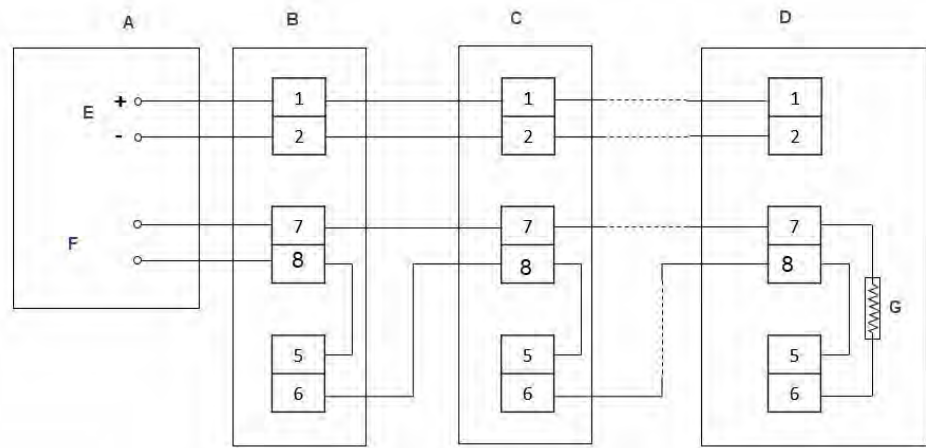
A. Controller
B. First detector
C. Second detector
D. Last detector
E. Power supply
F. Alarm loop
G. End of line

Figure 2-8: Non-isolated sink (three wires)
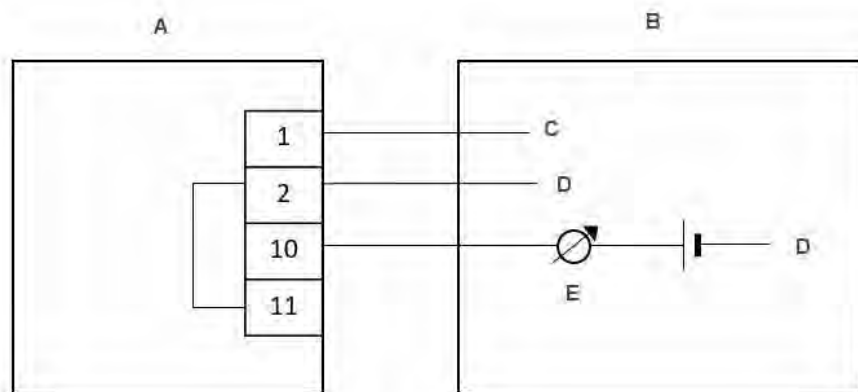
A. Detector
B. Controller
C. Input power: 18 to 32 Vdc
D. Return
E. 0-20 mA meter

Figure 2-9: Sink four-wire
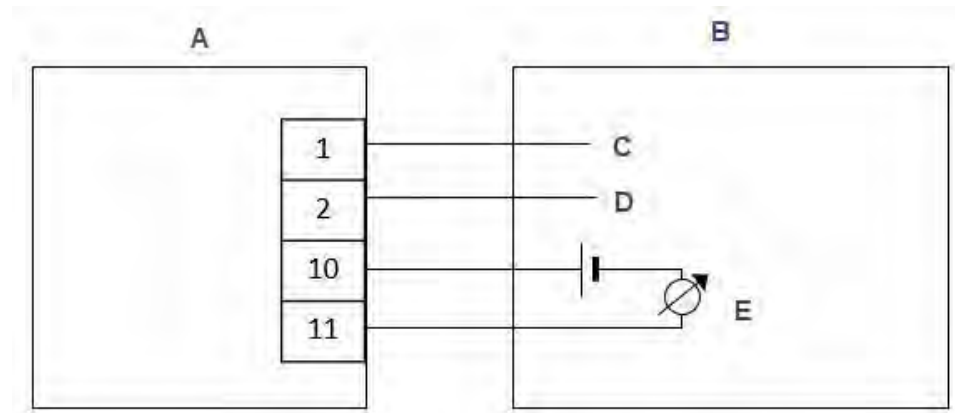
    A. *Detector*
    B. *Controller*
    C. *Input power: 18 to 32 Vdc*
    D. *Return*
    E. *0-20 mA meter*

Figure 2-10: Source three-wire
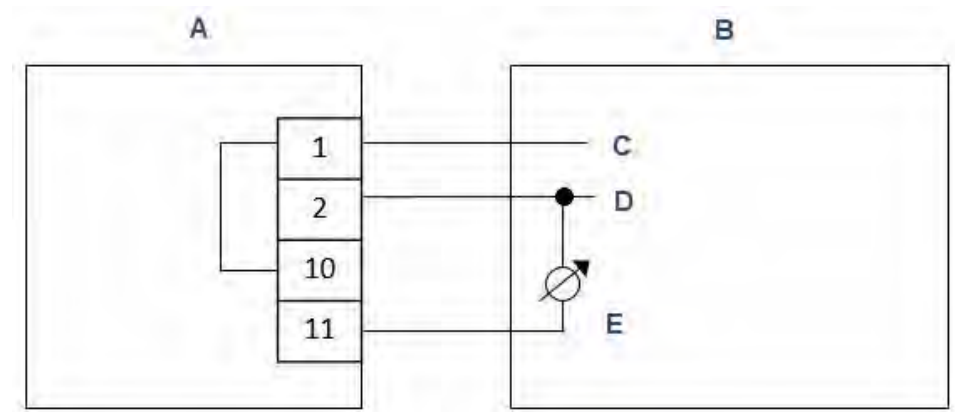
    A. *Detector*
    B. *Controller*
    C. *Input power: 18-32 Vdc*
    D. *Return*
    E. *0-20 mA meter*

Note
For additional configuration options, please refer to the Spectrex SharpEye 40/40C and D Series Flame Detectors Modbus® Manager Manual.

3. Check the wires for secure mechanical connection and press them neatly against the terminal to prevent them from interfering while closing the back cover.

4. Close the terminal compartment by screwing the back cover on to the housing.

5. Tighten the back cover security screw.

Figure 2-11: Closing security screw

A. *Back cover security screw*
B. *Ground cable connection point*

6. Connect the ground cable.

⚠ **WARNING**

The terminal temperature may be higher than 185 °F (85 °C).

⚠ **CAUTION**

To comply with EMC directive 2014/30/EU and protect against interference caused by radio frequency interference (RFI) and electromagnetic interference (EMI), shield the cable to the detector and ground the detector. Ground the shield at the detector end.

2.6   Install the protective cover

⚠ **CAUTION**

Always install the protective cover with the detector.

The protective cover is available in ABS plastic or stainless steel.

Table 2-3: Protective cover

Material	Part number
ABS plastic	00975-9000-0020
Stainless steel	00975-9000-0021

Procedure

1. Place the protective cover on top of the detector.

2. Secure the protective cover by tightening the screw.

   Note
   When installing the stainless steel protective cover, the same installation instructions apply.

2.7   Aim the detector

Aim the detector toward the center of the detection zone and make sure you have a completely unobstructed view of the protected area.

Emerson recommends positioning the detector tilted down at a 45° angle to maximize coverage and prevent accumulation of dust and dirt.

Do not begin installation until all conceivable considerations regarding detection location have been taken into account.

2.8   Changing default detector settings

The Main settings that can be modified using the Modbus® Manager or HART® communication include:

- Sensitivity

- Response time

- Heated optics functionality

- Alarm delay

- Accessory relay options

- Alarm latch

- Field of view integrity indication

Refer to the Spectrex SharpEye 40/40C and D Series Flame Detectors Modbus Manager Manual or the *Spectrex SharpEye 40/40C and D Series Flame Detectors HART Manual* for instructions on changing these settings.

3   Operation

3.1   **Power up the detector**

Procedure

After connecting the detector to power, wait up to 60 seconds for the detector to completed the initial start-up procedure.

Note

Turning on the detector initiates the following sequence of events:

     a. The yellow light-emitting diode (LED) flashes at 4 Hz.

     b. The built-in test (BIT) is executed.

     c. BIT completes.

     d. Detector enters Normal mode, indicated by:

         • Flashing green LED at 1 Hz.

         • Fault relay contacts closing.

         • mA output is 4 mA (for models featuring analog [voltage] output, this will be 2 V).

3.2   **Testing procedures**

This section describes the explosion proof testing procedure using the Spectrex™ explosion proof FS flame simulator series. The detector can also be tested using the Manual BIT.

Table 3-1: Flame Simulator Compatibility

Spectrex model flame simulator	Suitable with detectors
FS-1100	Spectrex 40/40C-I and 40/40D-1
FS-1200	Spectrex 40/40C-LB, 40/40C-L4B, 40/40D-LB, and 40/40D-L4B
FS-1400	Spectrex 40/40C-M and 40/40D-M

To perform a flame simulator test:

1. Power up the system and wait for up to 60 seconds for the detector to return to normal status.
   The *Power* LED turns on.

2. Ensure all indicators show normal (see Power up the detector).

For full instructions on operating a flame simulator test, see the relevant reference manual.

Table 3-2: Flame Simulator Reference Manuals

Flame simulator	Reference manual
Spectrex FS-1100	TM380002
Spectrex FS-1200	TM380102
Spectrex FS-1400	TM380302

4 Initial setup

4.1 Continuous feature test

The detector is supplied with default settings, including a continuous feature test.

To change these settings, refer to the Spectrex SharpEye 40/40C and D Series Flame Detectors Modbus® Manager Manual.

During normal operation, the detector tests itself continuously and indicates a fault if a failure is found. This type of test complies with SIL-3 requirements.

The detector continuously tests:

- Input voltage level
- All internal regulator voltage level
- Voltage level status of sensor and sensor circuitry for noise or disconnection in the electronic circuitry
- 0-20 mA level output
- Relays and heater operation
- Processor watch dog
- Software
- Memory
- Oscillator frequency

4.2 Response to fault indication

If a failure is found, the detector indicates by:

- Light-emitting diode (LED): yellow flashes (4 Hz)
- Fault relay opens
- 0-20 mA: 1 mA default
- Analog voltage output: 0 V output
  (SharpEye 40/40D models only)

The fault indications remain until the detector is turned off. The fault indications return if the fault is still found when power is restored.

4.3 Built-in-test (BIT)

The detector's BIT checks the following:

- Sensors
- Window cleanliness

- Electronic circuitry

The detector can be set to perform the BIT in the following modes:

- Automatically and manually
- Manually only

BIT operation

The BIT is intended to check optical integrity and electronic circuitry. The detector's status remains unchanged if the result of a BIT is the same as the current status (Normal or BIT Fault). The detector's status changes if the BIT differs from the current status.

Note
In BIT Fault status, the detector can continue to detect a fire in most cases.

Automatic BIT

The detector automatically performs a BIT every 15 minutes. A successful BIT sequence does not activate any indicator. The BIT interval can be modified if required by the customer using the RS-485 Modbus® Manager or HART® communicator. In case of a BIT fault, this sequence continues until a successful BIT occurs, when the detector resumes normal operation.

- As result of **successful** automatic/manual BIT, the fault relay remains **energized**.
- As result of **unsuccessful** automatic/manual BIT, the fault relay **de-energizes**.

Manual BIT

You can initiate manual BIT using the Modbus® Manager or HART® communicator. Connecting terminal 3 to ground also initiates manual BIT. Alarm duration during manual BIT is configurable using the Modbus Manager or HART communicator.

5 Maintenance

5.1 Keeping maintenance records

Record all maintenance operations performed on a detector in accordance with site guidance and requirements.

5.2 Clean the detector

Procedure

1. Disconnect power from the flame detector.
2. Wipe the detector housing with clean water and a damp cloth.

> **⚠ CAUTION**
>
> Do not use a brush or sharp tools.

3. Identify where dust, dirt, or moisture accumulates on the detector window.
   a) Clean with a soft optical cloth.
   b) Rinse with clean water.

6 Troubleshooting

6.1 Light-emitting diode (LED) is off, fault relay is open, 0-20 mA shows 0 mA, analog voltage output is 0 V

Note
Analog voltage output applies to SharpEye 40/40D models only.

Potential cause

No power to the unit.

Recommended actions

1. Check that the operating voltage is correct, according to Electrical specifications.
2. Check power polarity.
3. Check the terminal wiring.

6.2 Light-emitting diode (LED) flashes yellow at 4 Hz, fault relay is open, 0-20 mA shows 1 mA

Potential cause

Low voltage.

Recommended action

Check that the operating voltage is correct, according to Electrical specifications

Potential cause

Faulty detector.

Recommended action

Re-power the detector.

6.3 Light-emitting diode (LED) flashes yellow at 4 Hz, relay is open, 0-20 mA shows 2 mA

Potential cause

Built-in test (BIT) fault.

Recommended action

Ensure the detector window and reflector mirror are clean.

Potential cause

Faulty detector.

Recommended action

Re-power the detector.

6.4 Light-emitting diode (LED) constantly red, alarm relay energized, 0-20 mA indicates alarm

Potential cause

Existing alarm condition.

Recommended action

Check cause of alarm.

Potential cause

Alarm latched.

Recommended action

Ensure the alarm latch is not enabled in the detector settings.

Potential cause

Faulty detector.

Recommended action

Re-power the detector.

6.5 No HART® communication, 0-20 mA shows 0 mA

Potential

No HART is available at 0 mA level.

Recommended action

For Fault mode, the default indication is 1 mA. Configure this to 0 mA.

Emerson does not recommend this when using a HART connection in order to preserve the HART communication.

7   Specifications

7.1   Technical specifications

Spectral response

SharpEye 40/40C-I	Four infrared (IR) bands between 4 μm and 5 μm
SharpEye 40/40C-M	Four IR bands between 2 μm and 5 μm
SharpEye 40/40C-LB	Ultraviolet (UV): 0.185 - 0.260 μm IR: 2.5-3.0 μm
SharpEye 40/40C-L4B	UV: 0.185 - 0.260 μm IR: 4.3 – 4.8μm
SharpEye 40/40D-I	Four infrared (IR) bands between 4 μm and 5 μm
SharpEye 40/40D-M	Four IR bands between 2 μm and 5 μm
SharpEye 40/40D-LB	Ultraviolet (UV): 0.185 - 0.260 μm IR: 2.5-3.0 μm
SharpEye 40/40D-L4B	UV: 0.185 - 0.260 μm IR: 4.3 – 4.8μm

Detection range per fuel (ft./m)

Note
The ranges shown are at highest sensitivity setting for 1 ft^2 (0.1 m^2) pan fire.

Table 7-1: SharpEye 40/40C Models

Fuel	40/40C-I	40/40C-M	40/40C-LB	40/40C-L4B
Gasoline	215 ft (65 m)		50 ft (15 m)	93 ft (28 m)
N-Heptane	215 ft (65 m)		50 ft (15 m)	93 ft (28 m)
Diesel fuel	150 ft (45 m)		37 ft (11 m)	70 ft (21 m)
Kerosene	150 ft (45 m)		37 ft (11 m)	70 ft (21 m)
Alcohol 95%	135 ft (40 m)		30 ft (9 m)	57 ft (17 m)
IPA	135 ft (40 m)		37 ft (11 m)	70 ft (21 m)
Methanol	135 ft (40 m)		30 ft (9 m)	57 ft (17 m)
Methane	150 ft (45 m)		30 ft (9 m)	60 ft (18 m)
LPG	150 ft (45 m)		30 ft (9 m)	60 ft (18 m)
Polypropylene	115 ft (35 m)		30 ft (9 m)	60 ft (18 m)
Paper	82.0 ft (25 m)		16.4 ft (5 m)	33 ft (10 m)
Hydrogen	N/A	118.1 ft (36 m)	37 ft (11 m)	N/A

Table 7-1: SharpEye 40/40C Models *(continued)*

Fuel	40/40C-I	40/40C-M	40/40C-LB	40/40C-L4B
Magnesium alloy[1]	N/A		16.4 ft (5 m)	33 ft (10 m)
Gun powder	141.1 ft (43 m)		32.8 ft (10 m)	91.9 ft (28 m)
Fireworks	23.0 ft (7 m)		5.25 ft (1.6 m)	9.8 ft (3 m)
Cooking oil	147.6 ft (45 m)		37 ft (11 m)	70 ft (21 m)
Mineral oil: 20w50	150 ft (45 m)		37 ft (11 m)	70 ft (21 m)
Wood	82 ft (25 m)		16 ft (5 m)	33 ft (10 m)
Ethylene glycol	118 ft (36 m)		12 ft (3.66 m)	23 ft (7 m)
Butyl acrylate	117 ft (36 m)		37 ft (11 m)	70 ft (21 m)
Vinyl acetate	117 ft (36 m)		37 ft (11 m)	70 ft (21 m)
Flammable adhesive	150 ft (45 m)		37 ft (11 m)	70 ft (21 m)
Solvents	117 ft (36 m)		37 ft (11 m)	70 ft (21 m)
Oil paint	150 ft (45 m)		37 ft (11 m)	70 ft (21 m)
Jet fuel JP5	150 ft (45 m)		37 ft (11 m)	70 ft (21 m)
Jet fuel A1	150 ft (45 m)		37 ft (11 m)	70 ft (21 m)
Battery[2]	200 ft (61 m)		39 ft (12 m)	75 ft (23 m)

(1)   *Contact Spectrex representative for guidance on detecting Magnesium alloy.*
(2)   *One battery cell.*

Table 7-2: SharpEye 40/40D Models

Fuel	SharpEye 40/40D-I	SharpEye 40/40D-M	SharpEye 40/40D-LB	SharpEye 40/40D-L4B
Gasoline	300 ft (90 m)		93 ft (28 m)	
N-Heptane	300 ft (90 m)		93 ft (28 m)	
Diesel fuel	207 ft (63 m)		70 ft (21 m)	
Kerosene	207 ft (63 m)		70 ft (21 m)	
Alcohol 95%	185 ft (55 m)		57 ft (17 m)	
Isopropyl alcohol (IPA)	185 ft (55 m)		70 ft (21 m)	
Methanol	185 ft (55 m)		57 ft (17 m)	
Methane	207 ft (63 m)		60 ft (18 m)	
Liquified petroleum gas (LPG)	207 ft (63 m)		60 ft (18 m)	
Polypropylene	160 ft (49 m)		60 ft (18 m)	

Table 7-2: SharpEye 40/40D Models *(continued)*

Fuel	SharpEye 40/40D-I	SharpEye 40/40D-M	SharpEye 40/40D-LB	SharpEye 40/40D-L4B
Paper	112 ft (34 m)		10 ft (3 m)	
Hydrogen	N/A	164 ft (50 m)	70 ft (21 m)	N/A
Magnesium alloy[1]	N/A		33 ft (10 m)	
Gun powder	197 ft (60 m)		66 ft (20 m)	93 ft (28 m)
Fireworks	33 ft (10 m)		10 ft (3 m)	
Cooking oil	207 ft (63 m)		70 ft (21 m)	
Mineral oil: 20 w 50	207 ft (63 m)		70 ft (21 m)	
Wood	112 ft (34 m)		33 ft (10 m)	
Ethylene glycol	164 ft (50 m)		23 ft (7 m)	
Butyl acrylate	246 ft (75 m)		70 ft (21 m)	
Vinyl acetate	246 ft (75 m)		70 ft (21 m)	
Flammable adhesive	207 ft (63 m)		70 ft (21 m)	
Solvents	246 ft (75 m)		70 ft (21 m)	
Oil paint	207 ft (63 m)		70 ft (21 m)	
Jet fuel JP5	207 ft (63 m)		70 ft (21 m)	
Jet fuel A1	207 ft (63 m)		70 ft (21 m)	
Battery[2]	279 ft (85 m)		75 ft (23 m)	

(1) Contact Emerson representative for guidance on detecting magnesium alloy.
(2) One battery cell.

Standard response time

Table 7-3: SharpEye 40/40C Models

Spectrex 40/40C-I	Spectrex 40/40C-M	Spectrex 40/40C-LB	Spectrex 40/40C-L4B
Typically <5 sec			

Table 7-4: SharpEye 40/40D Models

SharpEye 40/40D-I	SharpEye 40/40D-M	SharpEye 40/40D-LB	SharpEye 40/40D-L4B
Typically <2 sec at 131 ft (40 m) 10 sec at 300 ft (90 m)		Typically 5 sec at 93 ft (28 m)	

Ultra fast response time

Table 7-5: SharpEye 40/40C Models

Spectrex 40/40C-I	Spectrex 40/40C-M	Spectrex 40/40C-LB	Spectrex 40/40C-L4B
N/A			

Table 7-6: SharpEye 40/40D Models

SharpEye 40/40D-I	SharpEye 40/40D-M	SharpEye 40/40D-LB	SharpEye 40/40D-L4B
Typically <1 sec at 100 ft (30 m)		20 msec for flash fire at 10 ft (3 m)	

High speed response time

Table 7-7: SharpEye 40/40C Models

Spectrex 40/40C-I	Spectrex 40/40C-M	Spectrex 40/40C-LB	Spectrex 40/40C-L4B
N/A			

Table 7-8: SharpEye 40/40D Models

SharpEye 40/40D-I	SharpEye 40/40D-M	SharpEye 40/40D-LB	SharpEye 40/40D-L4B
50 msec for 1 ft^2 (0.1 m^2) diameter sphere LPG-air mixture explosion at 66 ft (20 m)		50 msec for 1 ft^2 (0.1 m^2) diameter sphere LPG-air mixture explosion at 33 ft (10 m)	

Sensitivity ranges

Note
All distances relate to detection of a 1 ft^2 (0.1 m^2) n-heptane fire

Table 7-9: SharpEye 40/40C Models

Spectrex 40/40C-I	Spectrex 40/40C-M	Spectrex 40/40C-LB	Spectrex 40/40C-L4B
Five ranges: • 10 ft (3 m) • 50 ft (15 m) • 100 ft (30 m) • 150 ft (45 m) • 215 ft (65 m)		Two ranges: • 10 ft (3 m) • 50 ft (15 m)	Three ranges: • 10 ft (3 m) • 50 ft (15 m) • 92 ft (28 m)

Table 7-10: SharpEye 40/40D Models

SharpEye 40/40D-I	SharpEye 40/40D-M	SharpEye 40/40D-LB	SharpEye 40/40D-L4B
Six ranges: • 10 ft (3 m) • 50 ft (15 m) • 100 ft (30 m) • 150 ft (45 m) • 215 ft (65 m) • 300 ft (90 m)		Three ranges: • 10 ft (3 m) • 50 ft (15 m) • 92 ft (28 m)	

Field of view

Table 7-11: SharpEye 40/40C Models

Spectrex 40/40C-I	Spectrex 40/40C-M	Spectrex 40/40C-LB	Spectrex 40/40C-L4B
H: 100° V: 95°	Hydrogen: H: 90° V: 90°	H: 100° V: 95°	
H: 100° V: 95°	Other fuels: H: 80° V: 80°	H: 100° V: 95°	

Table 7-12: SharpEye 40/40D Models

SharpEye 40/40D-I	SharpEye 40/40D-M	SharpEye 40/40D-LB	SharpEye 40/40D-L4B
Horizontal: 100° Vertical: 95°	Hydrogen Horizontal: 90° Vertical: 90°	Horizontal: 100° Vertical: 95°	
	Other fuels Horizontal: 80° Vertical: 80°		

Temperature range (operating and storage)

Table 7-13: SharpEye 40/40C Models

Spectrex 40/40C-I	Spectrex 40/40C-M	Spectrex 40/40C-LB	Spectrex 40/40C-L4B
-40 °F (-40 °C) to 167 °F (75 °C)			

Table 7-14: SharpEye 40/40D Models

SharpEye 40/40D-I	SharpEye 40/40D-M	SharpEye 40/40D-LB	SharpEye 40/40D-L4B
-76 °F (-60 °C) to 185 °F (85 °C)			

Humidity

Non-condensing relative humidity up to 100 percent.

7.2   Electrical specifications

The electrical specifications apply to all models unless stated otherwise.

Operating voltage	24 Vdc nominal (18-32 Vdc)
Power consumption	Standby: Max. 3 W (8 W with heated window) Alarm: Max. 4.2 W (9.6 W with heated window)
Cable entries	2 x ¾-in - 14 NPT conduits or 2 x M25 x 1.5 mm International Organization for Standardization (ISO)
Electrical input protection	According to EN 50130
Electromagnetic capability	Electromagnetic interference/Radio frequency interference (EMI/RFI) protected to EN61000-6-3 and EN 50130
Electrical interface	The detector includes 17 terminals, one wiring option.

Electrical input protection

The input circuit is protected against voltage-reversed polarity, voltage transients, surges, and spikes according to EN 54-10.

Outputs

Relays	Alarm, fault, and auxiliary SPST volt-free contacts rated 2A at 30 Vdc	
Analog	5 V at detection, 0 V at fault, 2 V at normal	
0-20 mA (stepped)	**SharpEye 40/40C Models**	Fault: 0 +1 mA BIT fault: 2mA ± 0.3mA Normal: 4mA ± 0.3mA Warning: 16mA ± 0.3mA Alarm: 20mA ± 0.3mA
	SharpEye 40/40D Models	Fault: 0 +1 mA Built-in test (BIT) Fault: 2 mA ± 0.3 mA Normal: 4 mA ± 0.3 mA Warning: 16 mA ± 0.3 mA Alarm: 20 mA ± 0.3 mA

Heated optics

The front window can be heated to improve performance in ice, condensation, and snow conditions. The heater increases the temperature of the optical surface by 5 °C to 25 °C above the ambient temperature[1]. The heated optics can be configured in three ways:

Off	Optics are not heated

---

(1) *SharpEye 40/40D models have a low power heater option*

On   Optics are continuously heated

Auto (default) Operated only when the change of temperature requires the heating

---

Note

In Auto mode, the starting heat temperature can be defined between 32 °F (0 °C) and 95 °F (35 °C). The detector stops heating the window when the temperature is 15 °C above the start temperature.

7.3 Mechanical specifications

Enclosure options

SharpEye 40/40C Models	Heavy duty copper free aluminum (less than 1%), polyurethane painted
SharpEye 40/40D Models	Stainless steel 316 with electropolish finish Heavy duty copper free aluminum (less than one percent), polyurethane painted

Tilt mount

Stainless steel 316 with electropolish finish

Detector dimensions

4 in (100.6 mm) x 4.6 in (117 mm) x 6.18 in (155 mm)

Weight

SharpEye 40/40C Models	Detector: 2.8 lb (1.3 kg) Tilt mount 2.5 lb (1.13 kg)
SharpEye 40/40D Models	Stainless steel detector: 6.3 lb (2.9 kg) Aluminum detector: 2.8 lb (1.3 kg) Tilt mount 2.5 lb (1.13 kg)

Environmental standards

DNV 2-4[2]

Water and dust

IP66 and IP68 per EN 60529

---

(2) SharpEye 40/40D Models only

A   Reference data

A.1   Ordering information, specifications, and dimensional drawings

To view current SharpEye 40/40 Series ordering information, specifications, and dimensional drawings, follow these steps:

Procedure

1. Go to Spectrex.net/en-us/flame-gas-detectors-flame-detectors-40-40-series.
2. Select the appropriate product.
3. Scroll down to *Documents and Drawings*.
4. Select **DATA SHEETS & BULLETINS**
5. Select the appropriate Product Data Sheet.

A.2   Product certifications and installation drawings

To view current SharpEye 40/40 Series product certifications and installation drawings, follow these steps:

Procedure

1. Go to Spectrex.net/en-us/flame-gas-detectors-flame-detectors-40-40-series.
2. Select the appropriate product.
3. Scroll down to *Documents and Drawings*.
4. Select **CERTIFICATES & APPROVALS**
5. Select the appropriate document.

B   FM fuel test responses

Results of the FM fuel tests are as follows:

Table B-1: SharpEye 40/40C Models

Fuel	SharpEye 40/40C-I	SharpEye 40/40C-M	SharpEye 40/40 C-LB	SharpEye 40/40 C-L4B
Gasoline[1]	213 ft (65 m)		49 ft (15 m)	92 ft (28 m)
N-Heptane[1]	213 ft (65 m)		49 ft (15 m)	92 ft (28 m)
Diesel fuel[1]	148 ft (45 m)		36 ft (11 m)	69 ft (21 m)
JP5[1]	148 ft (45 m)		36 ft (11 m)	69 ft (21 m)
Kerosene[1]	148 ft (45 m)		36 ft (11 m)	69 ft (21 m)
Alcohol 95%[1]	131 ft (40 m)		30 ft (9 m)	56 ft (17 m)
IPA[1]	131 ft (40 m)		36 ft (11 m)	69 ft (21 m)
Methanol[1]	131 ft (40 m)		30 ft (9 m)	56 ft (17 m)
Methane[2]	148 ft (45 m)		33 ft (10 m)	59 ft (18 m)
LPG[2]	148 ft (45 m)		33 ft (10 m)	59 ft (18 m)
Polypropylene[1]	115 ft (35 m)		30 ft (9 m)	59 ft (18 m)
Paper[1]	82 ft (25 m)		16 ft (5 m)	33 ft (10 m)
Hydrogen[2]	N/A	118 ft (36 m)	36 ft (11 m)	N/A
Magnesium alloy[3]	N/A		16 ft (5 m)	33 ft (10 m)
Gun powder[4]	141 ft (43 m)		33 ft (10 m)	92 ft (28 m)
Fireworks[5]	23 ft (7 m)		5 ft (1.52 m)	10 ft (3 m)
Cooking oil[1]	148 ft (45 m)		36 ft (11 m)	69 ft (21 m)
Mineral oil: 20w50[1]	148 ft (45 m)		36 ft (11 m)	69 ft (21 m)
Wood[1]	82 ft (25 m)		16 ft (5 m)	33 ft (10 m)
Ethylene glycol[1]	118 ft (36 m)		12 ft (4 m)	23 ft (7 m)
Butyl acrylate[1]	117 ft (36 m)		36 ft (11 m)	69 ft (21 m)
Vinyl acetate[1]	117 ft (36 m)		36 ft (11 m)	69 ft (21 m)
Flammable adhesive [1]	148 ft (45 m)		36 ft (11 m)	69 ft (21 m)
Solvents[1]	117 ft (36 m)		36 ft (11 m)	69 ft (21 m)
Oil paint[1]	148 ft (45 m)		36 ft (11 m)	69 ft (21 m)
JET A1[1]	148 ft (45 m)		36 ft (11 m)	69 ft (21 m)

Table B-1: SharpEye 40/40C Models *(continued)*

Fuel	SharpEye 40/40C-I	SharpEye 40/40C-M	SharpEye 40/40 C-LB	SharpEye 40/40 C-L4B
Battery[6]	200 ft (61 m)		39 ft (12 m)	76 ft (23 m)

(1)   1 ft² (0.1 m²) pan fire
(2)   Plume fire: 2.5 ft (0.75 m) high, 0.8 ft (0.25 m) wide
(3)   Only for UV detector.
(4)   1.5 in² (10 cm²) pan fire
(5)   10 pieces per test.
(6)   One battery cell.

Table B-2: SharpEye 40/40D Models

Fuel	SharpEye 40/40D-I	SharpEye 40/40D-M	SharpEye 40/40D-LB	SharpEye 40/40D-L4B
Gasoline[1]	295 ft (90 m)		92 ft (28 m)	
N-Heptane[1]	295 ft (90 m)		92 ft (28 m)	
Diesel fuel[1]	207 ft (63 m)		69 ft (21 m)	
JP5[1]	207 ft (63 m)		69 ft (21 m)	
Kerosene[1]	207 ft (63 m)		69 ft (21 m)	
Alcohol 95%[1]	180 ft (55 m)		56 ft (17 m)	
Isopropyl alcohol[1]	180 ft (55 m)		69 ft (21 m)	
Methanol[1]	180 ft (55 m)		56 ft (17 m)	
Methane[2]	207 ft (63 m)		59 ft (18 m)	
Liquified petroleum gas (LPG)[1]	207 ft (63 m)		59 ft (18 m)	
Polypropylene[1]	161 ft (49 m)		59 ft (18 m)	
Paper[1]	112 ft (34 m)		33 ft (10 m)	
Hydrogen[1]	N/A	164 ft (50 m)	69 ft (21 m)	N/A
Magnesium alloy[3]	N/A		33 ft (10 m)	
Gun powder[4]	197 ft (60 m)		66 ft (20 m)	92 ft (28 m)
Fireworks[5]	33 ft (10 m)		10 ft (3 m)	
Cooking oil[1]	207 ft (63 m)		69 ft (21 m)	
Mineral oil: 20 w 50[1]	207 ft (63 m)		69 ft (21 m)	
Wood[1]	112 ft (34 m)		33 ft (10 m)	
Ethylene glycol[1]	164 ft (50 m)		23 ft (7 m)	
Butyl acrylate[1]	246 ft (75 m)		69 ft (21 m)	

Table B-2: SharpEye 40/40D Models *(continued)*

Fuel	SharpEye 40/40D-I	SharpEye 40/40D-M	SharpEye 40/40D-LB	SharpEye 40/40D-L4B
Vinyl acetate[1]	246 ft (75 m)		69 ft (21 m)	
Flammable adhesive [1]	207 ft (63 m)		69 ft (21 m)	
Solvents[1]	246 ft (75 m)		69 ft (21 m)	
Oil paint[1]	207 ft (63 m)		69 ft (21 m)	
Jet fuel A1[1]	207 ft (63 m)		69 ft (21 m)	
Battery[6]	279 ft (85 m)		76 ft (23 m)	

(1) *1 ft^2 (0.1 m^2) pan fire*
(2) *Plume fire: 2.5 ft (0.75 m) high, 0.8 ft (0.25 m) wide*
(3) *Only for ultraviolet (UV) detector.*
(4) *1.5 in^2 (10 cm^2) pan fire*
(5) *Ten pieces per test.*
(6) *One battery cell.*

C   Immunity to false alarm sources

Table C-1: Immunity to false alarm sources

IAD: Immunity at any distance

Radiation source	Immunity distance			
	SharpEye 40/40C-I and D-I	SharpEye 40/40C-M and D-M	SharpEye 40/40C-LB and D-LB	SharpEye 40/40C-L4B and D-L4B
Indirect or reflected sunlight	IAD	IAD	IAD	IAD
Vehicle headlights (low beam) conforming to MS53023	IAD	IAD	IAD	IAD
Incandescent frosted glass light, 300 W	IAD	IAD	IAD	IAD
Fluorescent light with white enamel reflector, standard office or shop, 80 W (or two 40 W)	IAD	IAD	IAD	IAD
Electric arc (15/32-in (12 mm)) gap at 4000 Vac, 60 Hz	IAD	IAD	IAD	IAD
Arc welding (5/16-in (6 mm)) rod, 210 A	See Table C-2.	See Table C-2.	See Table C-2.	See Table C-2.
Ambient light extremes (darkness to bright light with snow, water, rain, desert glare, or fog)	IAD	IAD	IAD	IAD
Bright colored clothing, including red and safety orange	IAD	IAD	IAD	IAD
Electronic flash (180 W seconds minimum output)	IAD	IAD	IAD	IAD
Movie light, 625 W quartz DWY lamp (Sylvania S.G. 55 or equivalent)	>6.5 ft (2 m)	>6.5 ft (2 m)	>13 ft (4 m)	>3 ft (1 m)
Blue green dome light conforming to M251073	IAD	IAD	IAD	IAD
Flashlight (MX 991/U)	IAD	IAD	IAD	IAD
Radiation heater, 3000 W	>3 ft (1 m)	>3 ft (1 m)	IAD	IAD
Radiation heater, 1000 W with fan	IAD	IAD	IAD	IAD
Quartz lamp (1000 W)	>3 ft (1 m)	>3 ft (1 m)	See Table C-3.	See Table C-3.
Mercury vapor lamp	IAD	IAD	IAD	IAD
Grinding metal	IAD	IAD	IAD	IAD
Lit cigar	>1 ft (0.3 m)	>1 ft (0.3 m)	IAD	IAD
Lit cigarette	>1 ft (0.3 m)	>1 ft (0.3 m)	IAD	IAD
Match, wood, stick, including flare up	>20 ft (6 m)	>10 ft (3 m)	>7 ft (2 m)	>7 ft (2 m)

Table C-1: Immunity to false alarm sources *(continued)*

Radiation source	Immunity distance			
	SharpEye 40/40C-I and D-I	SharpEye 40/40C-M and D-M	SharpEye 40/40C-LB and D-LB	SharpEye 40/40C-L4B and D-L4B
Vehicle exhaust diesel fume For SharpEye 40/40D-IH only	IAD	IAD	N/A	N/A

Table C-2: Welding immunity distance

Level	Range	Distance
1	>10 ft (3 m)	>1.6 ft (0.5 m)
2	>50 ft (15 m)	>6 ft (2 m)
3	>100 ft (30 m)	>12 ft (4 m)
4	>150 ft (45 m)	>17 ft (6 m)
5	>215 ft (65 m)	>25 ft (7.5 m)
6	>295 ft (90 m)	>33 ft (10 m)

Table C-3: Halogen immunity distance

Sensitivity level	Detection range	Halogen distance			
		SharpEye 40/40C-LB and D-LB		SharpEye 40/40C-L4B and D-L4B	
		750 W	1000 W	750 W	1000 W
1	10 ft (3 m)	>13 ft (4 m)	>15 ft (4.5 m)	>6 ft (2 m)	>8 ft (2.5 m)
2	50 ft (15 m)	>43 ft (13 m)	>50 ft (15 m)	>15 ft (4.5 m)	>16 ft (5 m)
3	93 ft (28 m)	>66 ft (20 m)	>70 ft (21 m)	>27 ft (8 m)	>30 ft (9 m)

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SPECTREX

Technical Manual

Sensepoint XCD
Gas Detector

1 Safety

Ensure that this Operating Manual is read and understood **BEFORE** installing / operating / maintaining the equipment. Pay particular attention to **Warnings** and **Cautions**. All document **Warnings** are listed here and repeated where appropriate at the start of the relevant chapter(s) of this Operating Manual. **Cautions** appear in the sections/sub-sections of the document where they apply.

WARNINGS

Sensepoint XCD is designed for installation and use in Zone 1 or 2 hazardous areas in many countries including Europe and for Class 1 Division 1 or 2 area applications in North America.

Installation must be in accordance with the recognized standards of the appropriate authority in the country concerned.

Access to the interior of the detector, when carrying out any work, must only be conducted by trained personnel.

Before carrying out any work ensure local regulations and site procedures are followed. Appropriate standards must be followed to maintain the overall certification of the detector.

For installations where conduit is used, and the sensor is mounted directly to the Sensepoint XCD, there must be a "Seal Fitting" installed for each of the cable gland entries within 18 inches of the Sensepoint XCD. The total distance of the location of these Seal Fittings is 18 inches. (e.g. If all 3 gland entries are to be used, 3 Seal Fittings should be located, each within 6 inches of the wiring entrance).

In order to maintain electrical safety, the product must not be operated in atmospheres with more than 21% oxygen. Oxygen deficient atmospheres (Combustible: less than 10%V/V, Toxic: less than 6%V/V) may suppress the sensor output.

If using an anti-seize compound, the threads should be thinly coated with an approved silicone free compound e.g. petroleum jelly

To reduce the risk of ignition of hazardous atmosphere, de-classify the area or disconnect the equipment from the supply circuit before opening the detector enclosure. Keep assembly tightly closed during operation.

Never attempt to open a junction box/enclosure or replace/refit the sensor in potentially hazardous atmospheres while power is still applied to the transmitter.

The detector must be earthed/grounded for electrical safety and to limit the effects of radio frequency interference. Earth/ground points are provided inside and outside the unit. The internal grounding shall be used as the primary equipment ground. The external terminal is only a supplemental bonding connection where local authorities permit or require such a connection.

Ensure that all screens/instrument earth/clean earth wiring is earthed/grounded at a single point (either at the controller or detector - BUT NOT BOTH) to prevent false readings or alarms that may occur due to potential earth/ground loops.

Take care when handling sensors as they may contain corrosive solutions.
Do not tamper with or in any way disassemble the sensor.
Do not expose to temperatures outside the recommended ranges.
Do not expose sensors under storage conditions to organic solvents or flammable liquids.

At the end of their working life, replacement electrochemical sensors for oxygen and toxic gas must be disposed of in an environmentally safe manner. Disposal should be according to local waste management requirements and environmental legislation.

Alternatively, old replaceable sensors may be securely packaged and returned to Honeywell Analytics clearly marked for environmental disposal.

Electrochemical sensors should NOT be incinerated as this action may cause the cell to emit toxic fumes.

Refer to the local or national regulations relative to the installation at the site. For Europe see EN60079-29-2, EN60079-14, EN45544-4 and EN61241-14.

This equipment is designed and constructed as to prevent ignition sources arising, even in the event of frequent disturbances or equipment operating faults.

The sensor head must be fitted with the supplied weather protection, and mounted so that the sinter is pointing downward to provide ingress protection IPX6.

The weather protection is a potential electrostatic charging hazard. The manufacturer's instructions should be observed.

NOTE: The control card must have a suitably rated fuse.

Special conditions for safe use – Sensepoint XCD with Flammable Sensor:

1. Compliance with the Technical Manual is required for safe use of Sensepoint XCD.

2. The following environmental conditions of operation apply for the use of the Sensepoint XCD:
   Temperature: -25 °C to +55 °C
   Relative humidity: 0 % to 90 %
   Pressure: 80 kPa to 120 kPa
   (extended range for temperature and humidity according to EN 60079-29-1)

3. In order to minimise measurement errors, the ambient conditions (temperature, pressure, humidity) during the calibration of the measuring channels should be as close as possible to those to be encountered during normal operation.

4. Measuring values from -4 %LEL to +2 %LEL are indicated as "0 %LEL"
   (4 mA analogue output) in the measuring mode. Below -4 %LEL is indicated as "-0"
   (3.5 mA) and below -5 %LEL (1 mA) a fault "F03" message is given additionally.

5. Measuring values beyond the end of the measuring range are indicated as
   100 %LEL and alternately blinking "W04" and "W05". The analogue output is set to
   22 mA.

6. Special states for Analogue output:
   • ≤ 1 mA: System and other faults
   • 2 mA: Start up, Inhibit
   • 3.5 mA   Under range
   • 22 mA: Over range

7. If the Sensepoint XCD is operating in conjunction with a control unit to analyse the measuring signal, the control unit must operate correctly when the XCD transmits a value outside of the measuring range.

8. If substances (e. g. sensor poisons) that could interfere with and affect the sensitivity of the sensing device are to be expected in the atmosphere to be monitored which may cause a rapid change of sensitivity, the calibration interval shall be reduced.

9. Before use, ensure that any alarm delay set is suitable for the intended application.

10. Some types and concentrations of dust in the measured atmosphere may impair the measuring function of the gas detector.

11. Use only with the Weather Protection Cup accessory (P/N SPXCDWP).

12. The EC-Type examination certificate only applies to the measuring of Methane, Ethane and Propane in air and up to the Lower Explosive Limit (LEL). Additional subtests of an ATEX notified body are required for the measuring of other flammable gases, the results being informed about as addition to this certificate.

Special conditions for Sensepoint XCD with Oxygen Sensor:

1. Compliance with the Technical Manual is required for safe use of Sensepoint XCD.

2. The following environmental conditions of operation apply for the use of Sensepoint XCD with oxygen sensor:
   Temperature: -20 °C to +55 °C
   Relative humidity: 20 % to 90 %
   Pressure: 80 kPa to 120 kPa
   (extended range for temperature according to EN 50104)

3. In order to minimise measurement errors, the ambient conditions (temperature, pressure, humidity) during the calibration of the measuring channels should be as close as possible to those to be encountered during normal operation.

4. Measuring values from 20.7 % (v/v) up to 21.1 % (v/v) are indicated as "20.9" % (v/v) oxygen during operation in the measuring mode. Measuring values below 3 % (v/v) oxygen are indicated as 0 % (v/v) oxygen (analogue output 4 mA).

5. Measuring values above the end of the measuring range are indicated as 25 % (v/v) O_2 and blinking "W04". The analogue output is set to 22 mA.

    Fault messages are shown on the display as "F-XX" and the analogue output is set to 1 mA.

6. Special states for Analogue output:
    *   ≤ 1 mA: System and other faults
    *   2 mA: Start up, Inhibit
    *   22 mA: Over ranging

7. If the Sensepoint XCD is operating in conjunction with a control unit to analyse the measuring signal, the control unit must operate correctly when the XCD transmits a value outside of the measuring range.

8. Use without Weather Protection Cup accessory (P/N SPXCDWP), only.

9. If substances (e. g. sensor poisons) that could interfere with and affect the sensitivity of the sensing device are to be expected in the atmosphere to be monitored which may cause a rapid change of sensitivity, the calibration interval shall be reduced.

10. Before use, ensure that any alarm delay set is suitable for the intended application.

11. Before use, consideration must be given to cross sensitivity to other gases. Refer to the Sensepoint XCD Technical Manual and the Sensor Datasheet for cross interference data.

12. Some types and concentration of dust in the measured atmosphere may impair the measuring function of the gas detector.

13. The Type Examination Certificate applies to the measurement of oxygen up to 25 % (v/v).

2 Information

This manual is for use with the Sensepoint XCD range transmitters only.

The Start-up/Surge/In rush current is dependant on the type of power supply used. The typical start-up current for Sensepoint XCD is less than 800mA. Measure the start-up current using the specific power supply before installation to ensure suitability for your application.

Honeywell Analytics can take no responsibility for installation and/or use of its equipment if not done so in accordance with the appropriate issue and/or amendment of the Operating Manual.

The reader of this Operating Manual should ensure that it is appropriate in all details for the exact equipment to be installed and/or operated. If in doubt, contact Honeywell Analytics for advice.

The following types of notices are used throughout this Operating Manual:

WARNING

Identifies a hazardous or unsafe practice which could result in severe injury or death to personnel.

Caution: Identifies a hazardous or unsafe practice which could result in minor injury to personnel, or product or property damage.

Note: Identifies useful/additional information.

Every effort has been made to ensure the accuracy of this document, however, Honeywell Analytics can assume no responsibility for any errors or omissions in this document or their consequences.

Honeywell Analytics would greatly appreciate being informed of any errors or omissions that may be found in the content of this document.

For information not covered in this document, or if there is a requirement to send comments/corrections about this document, please contact Honeywell Analytics using the contact details given on the back page.

Honeywell Analytics reserve the right to change or revise the information supplied in this document without notice and without obligation to notify any person or organization of such revision or change. If information is required that does not appear in this document, contact the local distributor/agent or Honeywell Analytics.

3 Table of contents

4 Introduction

The Sensepoint XCD ("Exceed") comprises a gas detector transmitter and a choice of sensors for detecting flammable gas, toxic gas and oxygen. The construction of Sensepoint XCD allows it to be used in hazardous area locations; it may also be used in other areas not classified as hazardous.

As well as a comprehensive range of Sensepoint XCD sensors, a wide range of existing Honeywell Analytics sensors may be used with the Sensepoint XCD transmitter to detect a broader range of target gases (please contact Honeywell Analytics for further details).

The transmitter features a display and three programmable relays for controlling external equipment e.g. alarms, sirens, valves or switches. The transmitter provides an industry standard 3-wire, 4-20mA source or sink output for connection to a dedicated gas detection control system or PLC.

Calibration and maintenance is carried out using a Magnetic Wand, this allows a single user to undertake routine maintenance without needing to access internal components. Sensepoint XCD is suitable for use in Zone 1 or 2 hazardous areas (International) or Class I Division 1 or 2 area applications (North America).

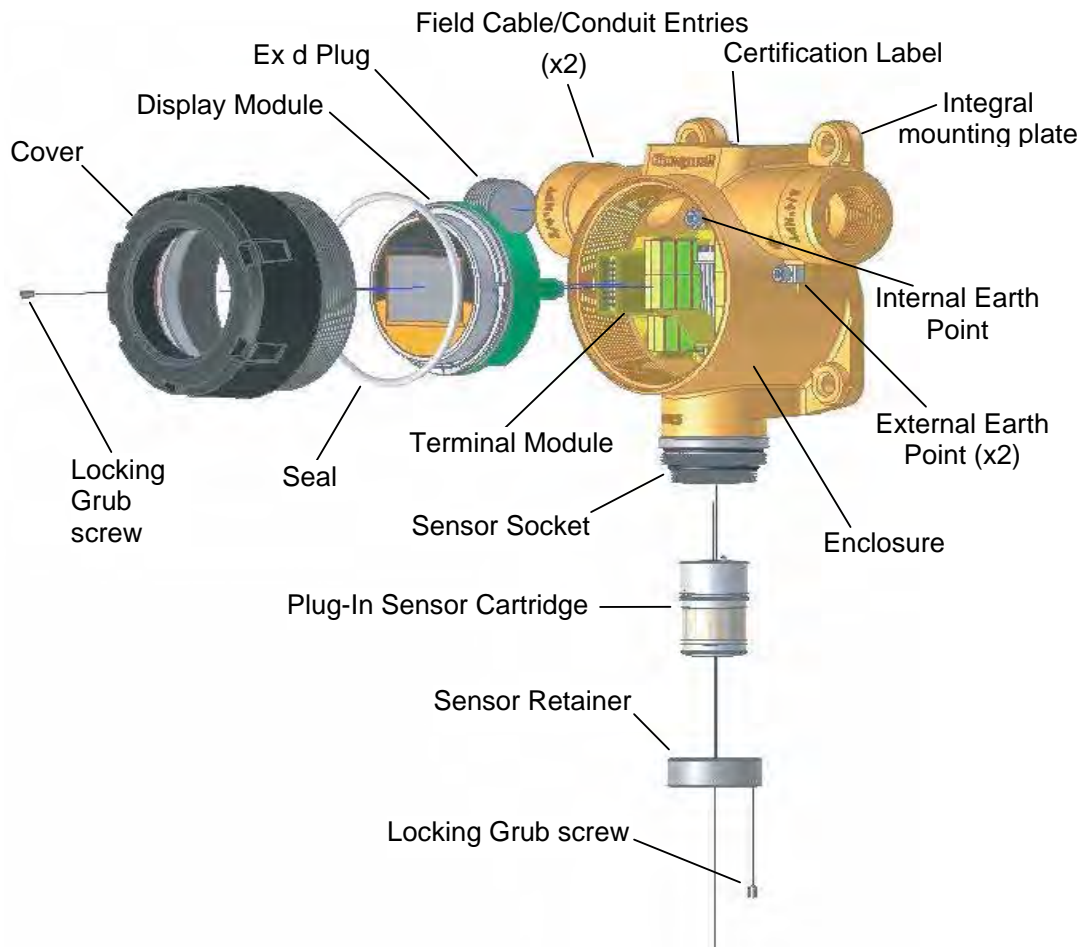Sensepoint XCD comprises of the main parts as shown below.

Diagram 1. – Exploded View

4.1 Transmitter

The transmitter enclosure has three threaded entries. The two cable/conduit entries either side of the upper part of the transmitter housing are for connecting the power source, signal output and relay contacts to associated signalling equipment. The bottom entry allows direct connection of the sensor socket. There is a mounting plate incorporated into the transmitter housing allowing for various mounting configuration options.

A local LCD provides gas type, concentration, alarm and operating status. The display provides numerical, bar graph and icon information.

Diagnostic information may also be displayed when the transmitter is interrogated using a magnet. The transmitter cover has a glass window which allows use of the Magnetic Wand to activate the three user interface magnetic switches that are located on the front of the display module. The magnet also enables a non intrusive, one-man calibration and configuration facility for the Sensepoint XCD.
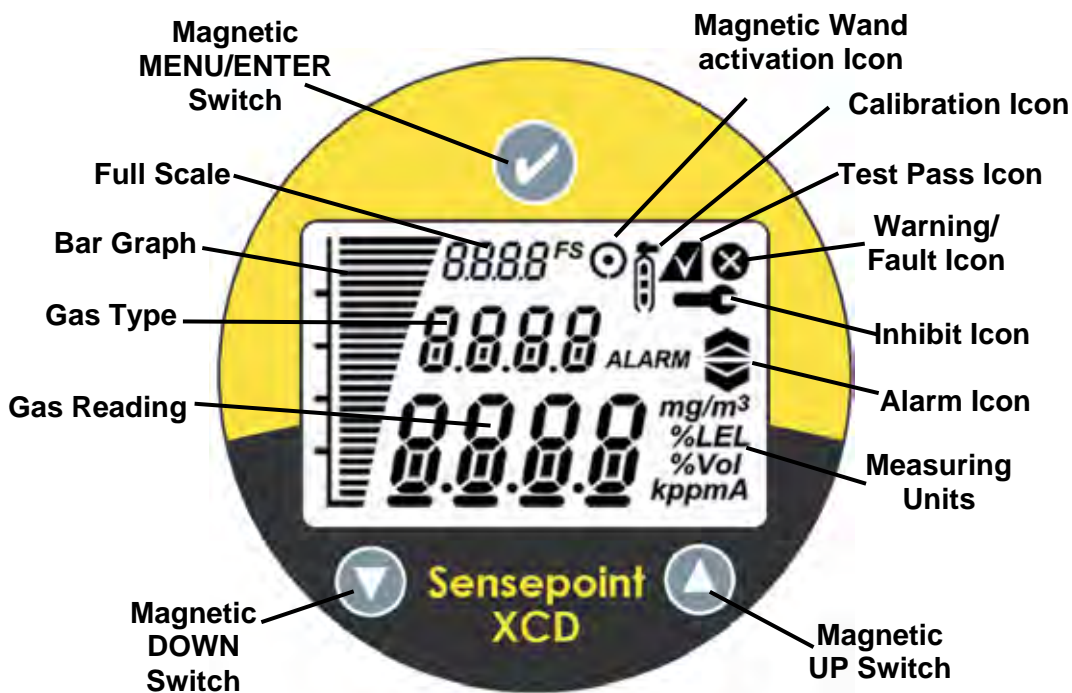
Diagram 2: Sensepoint XCD Display and Magnetic Switches

4.2 Flammable, Toxic and Oxygen Gas sensors

The Sensepoint XCD transmitter is designed to work with a variety of gas sensors for detecting flammable gases. Sensepoint XCD sensors use NDIR infrared and electro-catalytic technologies.
In addition, the Sensepoint XCD transmitter is designed to work with a wide range of toxic gas sensors. Sensepoint XCD sensors for monitoring toxic gas or oxygen use electro-chemical cell (ECC) technology. Oxygen sensors measure Oxygen deficiency and enrichment in the range 0 - 25 %V/V. They do not measure inertization.
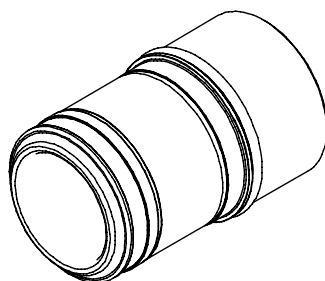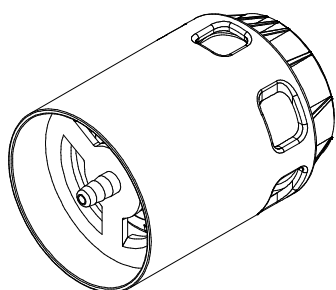
Diagram 3: Sensepoint XCD Flammable, Toxic and Oxygen Sensor Cartridge

4.3 Accessories

A range of accessories are available to allow use of Sensepoint XCD in a wide variety of applications. These including mounting brackets, maintenance tools, weather housings, flow housing, collecting cone, duct mounting kit and sensor junction boxes.


Standard Weather Protection

The Standard Weather Protection (P/N: SPXCDWP) is designed to protect the sensor from changes in environmental conditions. This is recommended to be fitted to a Sensepoint XCD sensor for outdoor exposed applications, (supplied with XCD kit).
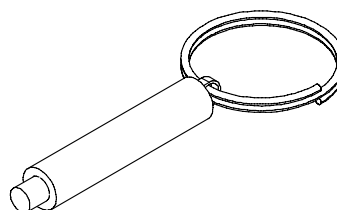
Magnetic wand

The magnetic wand (P/N: SPXCDMAG) is used as a tool to allow the user to communicate with the Sensepoint XCD transmitter for the purpose of configuration, calibration and interrogating system status, (supplied with XCD kit).
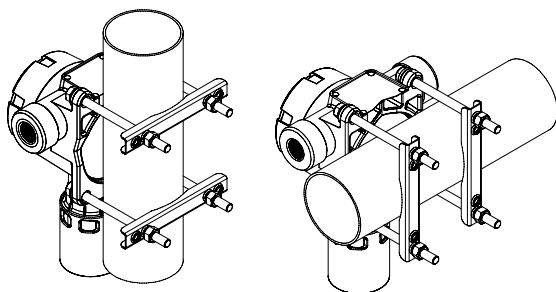
Pipe mounting bracket

The Pipe Mounting Bracket (P/N: SPXCDMTMB) is an optional accessory and may be used to allow the Sensepoint XCD to be installed onto a dedicated mounting post or existing structure at the desired location.
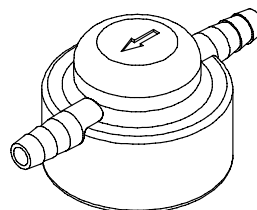
Gassing Cap

The Gassing Cap (P/N: S3KCAL) is an optional accessory that may be temporarily fitted to the sensor in place of the Weather Protection for Gas Response checking during commissioning and routine maintenance.
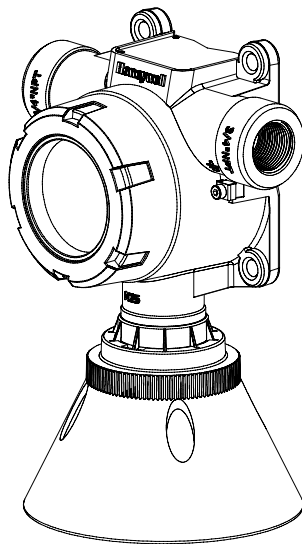
Collecting cone

The Collecting Cone (P/N: SPXCDCC) is an optional accessory that may be fitted to the Weather Protection. The collecting cone is designed for use with lighter than air.
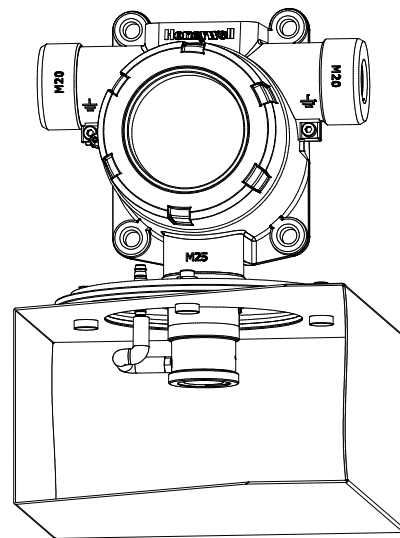
Duct mounting kit

The Duct Mounting Kit (P/N: SPXCDDMK) is an optional accessory that is designed for applications to allow the monitoring for the presence of gas inside a Heating, Ventilation or Air Conditioning (HVAC) duct is required.
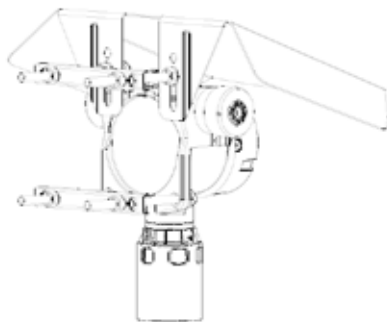
Sunshade Deluge Cover

The XCD Sunshade Deluge Cover (P/N: SPXCDSDP) is an optional accessory that may be fitted to the integral mounting plate. This accessory is designed to protect XCD from overheating in exposed hot and arid climates, particularly offering additional protection from thermal shock in Tropical Environments
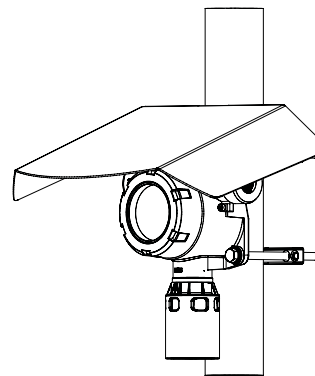
Typical Mounting Arrangement

4.4 Options

4.4.1 Modbus® (*Modbus option not tested as part of the performance approvals*)

One of the most common field buses in the industry, the optional Modbus® interface allows the XCD to connect to a bus of devices and transmit data to PLCs or controllers (see Appendix A). Connections to the XCD are made through a pluggable terminal block on the Modbus® interface circuit board. Modbus® RTU protocol uses ASCII/Hex protocols for communication. and allows all transmitter/sensor front panel functions to be transmitted using this industrial fieldbus. Modbus® protocol is a Master-Slaves protocol. Only one master (at the same time) is connected to the bus and one or up to 32 slave nodes are also connected to the same serial bus. Modbus® communication is always initiated by the master. The slave nodes will never transmit data without receiving a request from the master node. The slave nodes will never communicate with each other. The master node initiates only one Modbus® transaction at the same time.
Modbus® option is available only for selected gases. Please refer to chapter 15 Ordering information.
To find out if a unit has the Modbus® option fitted, look at the part number on the product label. Units fitted with Modbus® have the letter "M" at the end of the part number.

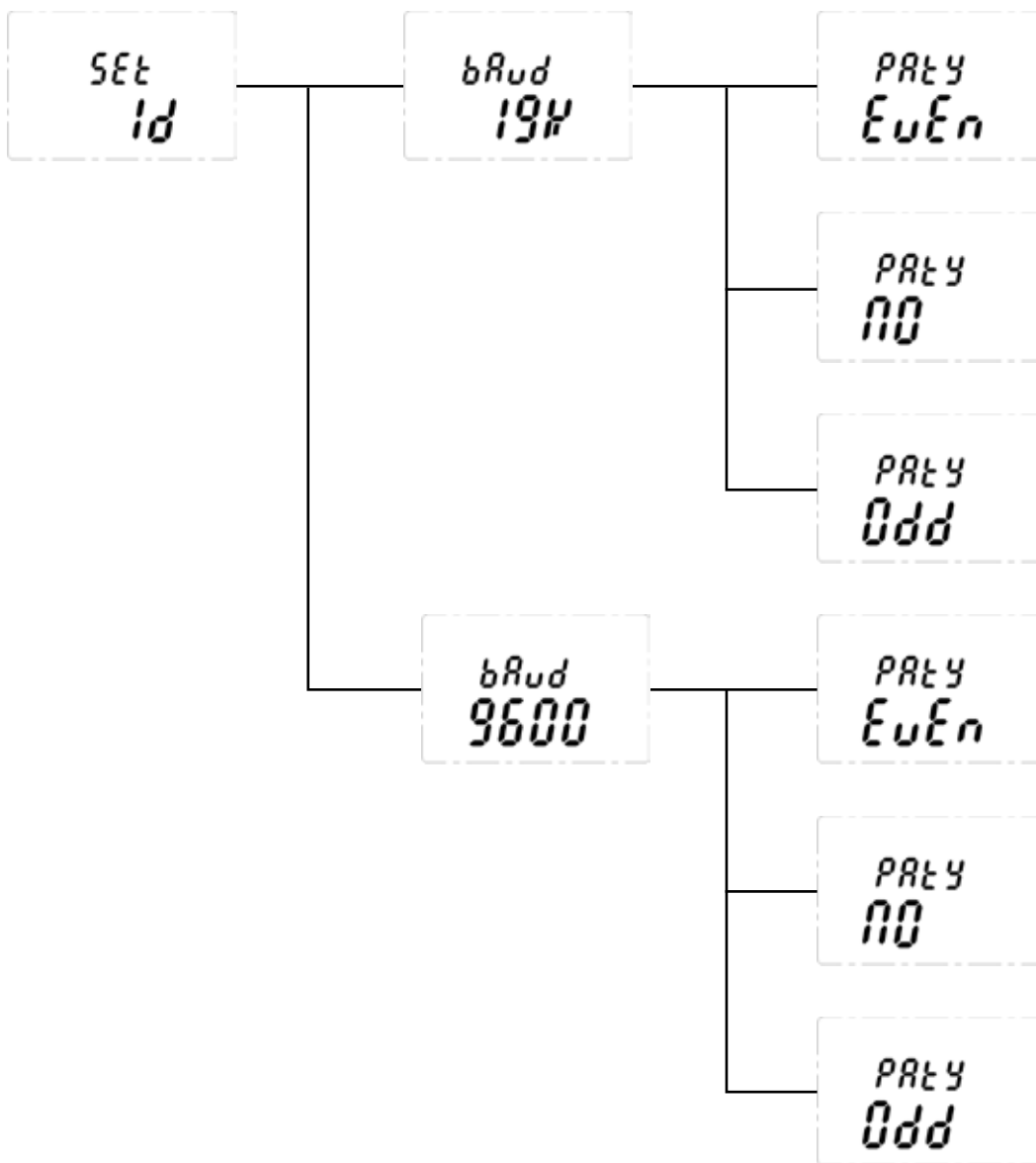Note: MODBUS® is a registered trademark of Schneider Automation Inc.

(MODBUS ID SETTING)
Set id>>Set ModBus slave ID>>Set Baud rate>>Set Parity
1) Slave ID shall be set 1~247
2) Baud rate setting 9600 or 19200
3) Parity setting (No, Even, Odd)
From the Configuration Mode screen, select '✓'. To set the ModBus Slave ID, use the updown '▲▼'switches to move to the desired position and use '✓' to select it. Again, using the'▲▼'switches, increment or decrement the value until the desired value appears, selects the value and moves to the next setting.

```
  SEt                bRud               PRtY
   Id                 19H               EuEn

                                        PRtY
                                         no

                                        PRtY
                                        Odd

                     bRud               PRtY
                     9600               EuEn

                                        PRtY
                                         no

                                        PRtY
                                        Odd
```

The communications baud rate and Parity Setting can also be set from this screen by using the'▲▼' switches to navigate to the baud rate display then selecting '✓'. Using the '▲▼'switches, highlight the proper baud rate or parity setting and select'✓'. Default is Slave ID 1, 19200bps and even parity.

Note: Set ID menu is available only for XCD equipped with Modbus option.

5 Installation

WARNINGS

Sensepoint XCD is designed for installation and use in Zone 1 or 2 hazardous areas in many countries including Europe and for Class 1 Division 1 or 2 area applications in North America.
Installation must be in accordance with the recognized standards of the appropriate authority in the country concerned.

Access to the interior of the detector, when carrying out any work, must only be conducted by trained personnel.

Before carrying out any work ensure local regulations and site procedures are followed. Appropriate standards must be followed to maintain the overall certification of the detector.

Care should be taken when removing and refitting the Sensepoint XCD plug-in Sensor to the Sensor Socket so that damage to the connection pins can be avoided.

For installations where conduit is used, and the sensor is mounted directly to the Sensepoint XCD, there must be a "Seal Fitting" installed for each of the cable gland entries within 18 inches of the Sensepoint XCD. For installations where the sensor will be mounted remotely from Sensepoint XCD, an additional "Seal Fittings" will be required: One at each of the conduit entries for the power/signal/relay contact outputs and one at the sensor wiring entrance. The total distance of the location of these Seal Fittings is 18 inches. (e.g. If all 3 gland entries are to be used, 3 Seal Fittings should be located, each within 6 inches of the wiring entrance).

If using an anti-seize compound, the threads should be thinly coated with an approved silicone free compound e.g. petroleum jelly

To reduce the risk of ignition of hazardous atmosphere, de-classify the area or disconnect the equipment from the supply circuit before opening the detector enclosure. Keep assembly tightly closed during operation.

Never attempt to open a junction box/enclosure or replace/refit the sensor in potentially hazardous atmospheres while power is still applied to the transmitter.

The detector must be earthed/grounded for electrical safety and to limit the effects of radio frequency interference. Earth/ground points are provided inside and outside the unit. Ensure that all screens/instrument earth/clean earth wiring is earthed/grounded at a single point (either at the controller or detector - BUT NOT BOTH) to prevent false alarms due to earth/ground loops.

Take care when handling sensors as they may contain corrosive solutions.
Do not tamper with or in any way disassemble the sensor.
Do not expose to temperatures outside the recommended ranges.
Do not expose sensors under storage conditions to organic solvents or flammable liquids.

At the end of their working life, replacement electrochemical sensors for oxygen and toxic gas must be disposed of in an environmentally safe manner. Disposal should be according to local waste management requirements and environmental legislation.
Alternatively, old replaceable sensors may be securely packaged and returned to Honeywell Analytics clearly marked for environmental disposal.

Electrochemical sensors should NOT be incinerated as this action may cause the cell to emit toxic fumes.

Refer to the local or national regulations relative to the installation at the site. For Europe see EN60079-29-2, EN60079-14, EN45544-4 and EN61241-14.

This equipment is designed and constructed as to prevent ignition sources arising, even in the event of frequent disturbances or equipment operating faults.

The sensor head must be fitted with the supplied weather protection, and mounted so that the sinter is pointing downward to provide ingress protection IPX6.

The weather protection is a potential electrostatic charging hazard. The manufacturer's instructions should be observed.

NOTE: The control card must have a suitably rated fuse.

5.1 Mounting and location

> *Caution: The location of gas detectors should be made in accordance with any relevant local and national legislation, standards or codes of practice. Always replace sensors with a sensor of the same type.*

Gas detectors should be mounted where a potential hazard of gas is most likely to be present. The following points should be noted when locating gas sensors.

- When locating detectors consider the possible damage caused by natural events e.g. rain or flooding.
- Consider ease of access to the gas detector for functional testing and servicing.
- Consider how escaping gas may behave due to natural or forced air currents.

Note: The placement of gas detectors should be determined following the advice of experts having specialist knowledge of gas dispersion, experts having knowledge of the process plant system and equipment involved, safety and engineering personnel. The agreement reached on the location of detectors should be recorded.

5.2 Mounting the transmitter

The Sensepoint XCD transmitter has an integral mounting plate consisting of four mounting holes on the transmitter body. The transmitter may be fixed directly to a surface mounting, or to a horizontal or vertical pipe/structure, 40.0-80.0mm (1.6 to 3.1 inches) in diameter/cross section. The Pipe Mounting Bracket accessory (optional accessory) may be used for this purpose.

M20 entries for ATEX/IECEx/AP Versions and 3/4"NPT cable/conduit entries on UL/CSA versions

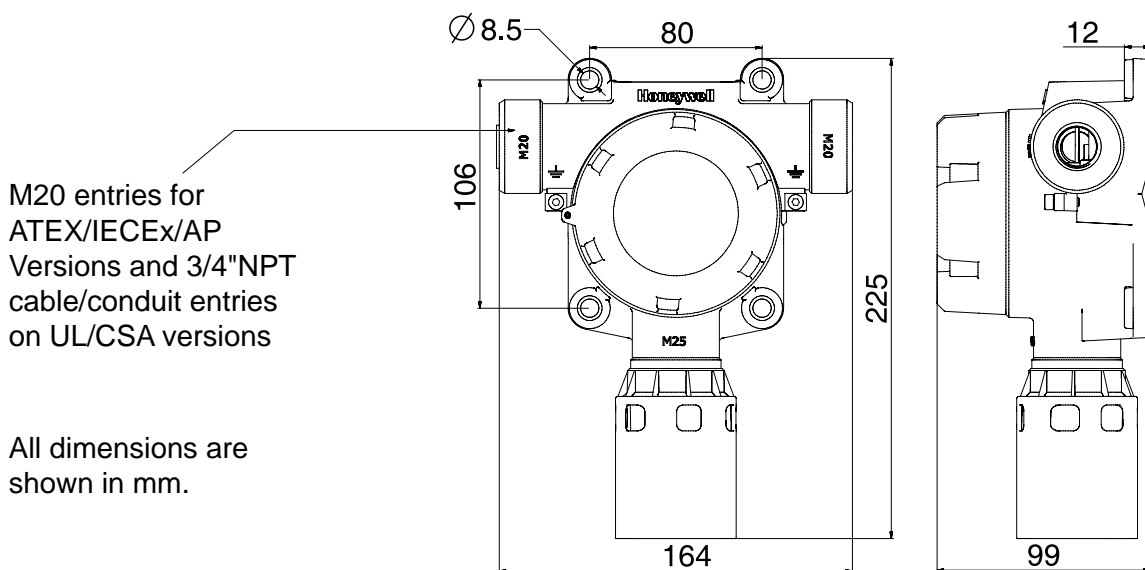All dimensions are shown in mm.

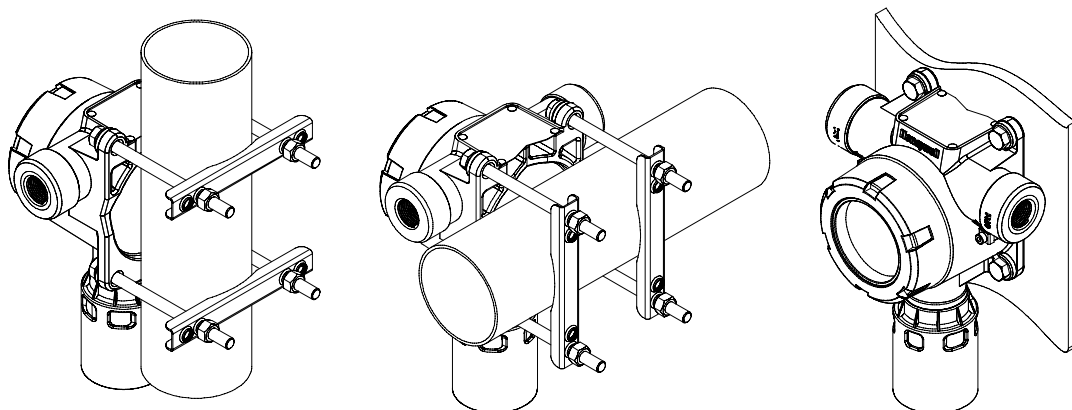Diagram 4: Outline and mounting dimensions

Diagram 5: Mounting arrangements

To mount the Sensepoint XCD transmitter to a Vertical or Horizontal pipe/structure, use the optional XCD Mounting Kit and following procedure:

1. Fit the four spring washers, then the plain washers to the M8 x 80mm SS316 bolts.
2. Pass the four bolts through the four mounting holes of the transmitter housing.
3. **Note:** If the XCD sunshade is to be used then fit the sunshade and the two locking bolts and washers to the M8 x 80 bolts.
4. Place the transmitter housing against the mounting position and fit the two "U" channel mounting bars the other side of the Pipe/Structure.
5. Secure bolts to the threaded holes of the "U" channel mounting bars.
6. Tighten the four bolts securely, (but do not over-tighten) until the transmitter housing cannot be moved by hand on its mounting position.

Note: For further details of installation please see section 17.

5.3 Installing the sensor

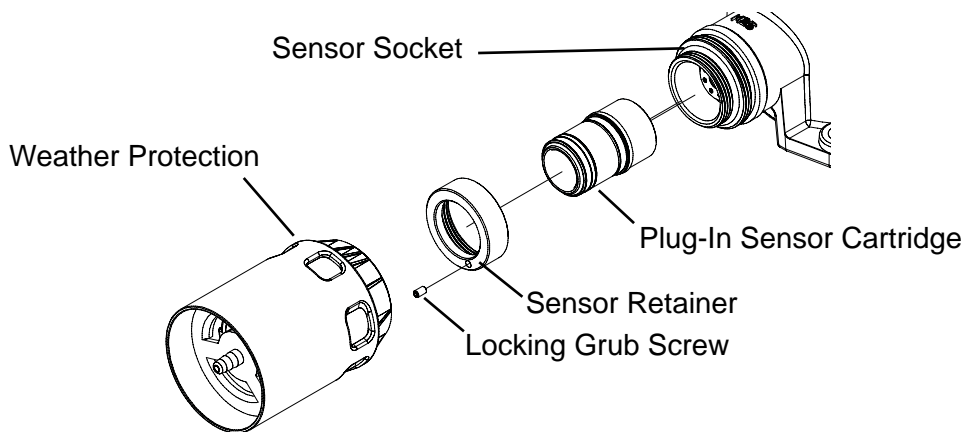The XCD gas sensor cartridge plugs into the XCD Sensor Socket.

Diagram 6: Installing the Sensor

WARNINGS

Care should be taken when removing and refitting the Sensepoint XCD plug-in Sensor to the Sensor Socket so that damage to the connection pins can be avoided.

If using an anti-seize compound, the threads should be thinly coated with an approved silicone free compound e.g. petroleum jelly

Take care when handling old sensors as they may contain corrosive solutions.

Take care when removing or replacing the Sensor Retainer as there may be sharp edges present on the adjoining threads.

The equipment is designed and constructed as to prevent ignition sources arising, even in the event of frequent disturbances or equipment operating faults.

The sensor head must be fitted with the supplied weather protection, and mounted so that the sinter is pointing downward to provide ingress protection IPX6.

The weather protection is a potential electrostatic charging hazard. The manufacturer's instructions should be observed.

To install the XCD Sensor Cartridge to the XCD Sensor Socket:

1. Remove the weather protection (if fitted) from the sensor.

2. Use a 1.5mm Allen key (hexagonal wrench-included) to loosen the Locking Grub Screw on the Sensor Retainer.

3. Unscrew and remove the Sensor Retainer.

4. Remove the XCD Sensor Cartridge from its packaging and plug it into the XCD Sensor Socket, taking care to align the sensor pins with the connector.

5. Refit the Sensor Retainer and tighten the Locking Grub Screw.

6. Refit the weather protection (as required) to the XCD sensor.

6   Electrical connections

WARNINGS

Sensepoint XCD is designed for installation and use in Zone 1 or 2 hazardous areas in many countries including Europe and Class 1 Division 1 or 2 area applications in North America. Installation must be in accordance with the recognized standards of the appropriate authority in the country concerned.

Access to the interior of the detector, when carrying out any work, must only be conducted by trained personnel.

Before carrying out any work ensure local regulations and site procedures are followed. Appropriate standards must be followed to maintain the overall certification of the detector.

Care should be taken when removing and refitting the Sensepoint XCD Sensor Cartridge to the Sensor Socket so that damage to the connection pins can be avoided.

For installations where conduit is used, and the sensor is mounted directly to the Sensepoint XCD, there must be a "Seal Fitting" installed for each of the cable gland entries within 18 inches of the Sensepoint XCD. The total distance of the location of these Seal Fittings is 18 inches. (e.g. If all 3 gland entries are to be used, 3 Seal Fittings should be located, each within 6 inches of the wiring entrance).

If using an anti-seize compound, the threads should be thinly coated with an approved silicone free compound e.g. petroleum jelly

To reduce the risk of ignition of hazardous atmosphere, de-classify the area or disconnect the equipment from the supply circuit before opening the detector enclosure. Keep assembly tightly closed during operation.

Never attempt to open a junction box/enclosure or replace/refit the sensor in potentially hazardous atmospheres while power is still applied to the transmitter.

The detector must be earthed/grounded for electrical safety and to limit the effects of radio frequency interference. Earth/ground points are provided inside and outside the unit. Ensure that all screens/instrument earth/clean earth wiring is earthed/grounded at a single point (either at the controller or detector - BUT NOT BOTH) to prevent false alarms due to earth/ground loops.

Take care when handling sensors as they may contain corrosive solutions.
Do not tamper with or in any way disassemble the sensor.
Do not expose to temperatures outside the recommended ranges.
Do not expose sensors under storage conditions to organic solvents or flammable liquids.

At the end of their working life, replacement electrochemical sensors for oxygen and toxic gas must be disposed of in an environmentally safe manner. Disposal should be according to local waste management requirements and environmental legislation.
Alternatively, old replaceable sensors may be securely packaged and returned to Honeywell Analytics clearly marked for environmental disposal.

Electrochemical sensors should NOT be incinerated as this action may cause the cell to emit toxic fumes.

Refer to the local or national regulations relative to the installation at the site. For Europe see EN60079-29-2, EN60079-14, EN45544-4 and EN61241-14.


6.1 Transmitter Wiring

> *Caution: All electrical connections should be made in accordance with any relevant local or national legislation, standards or codes of practice.*

The Sensepoint XCD transmitter may be wired in either Current SOURCE or Current SINK configuration. These two options are offered to allow greater flexibility in the type of control system that it can be used with. SOURCE/SINK is selectable via the switch located on the back side of the display module; accessible by removing the display module during installation / commissioning (see section 9).
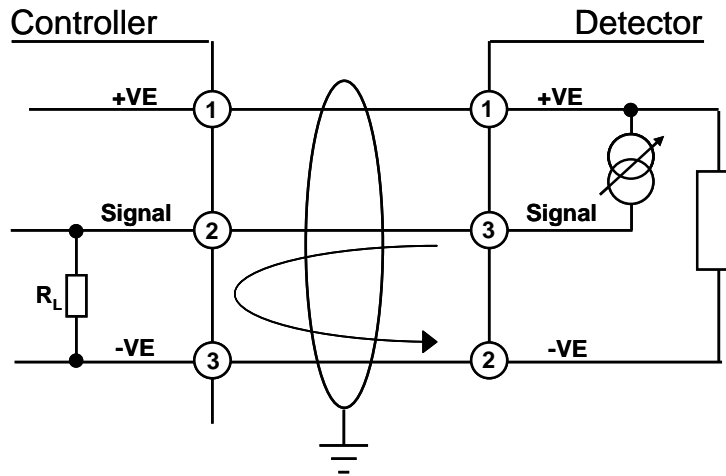
XCD Source 3 Wire 4-20mA (Source)
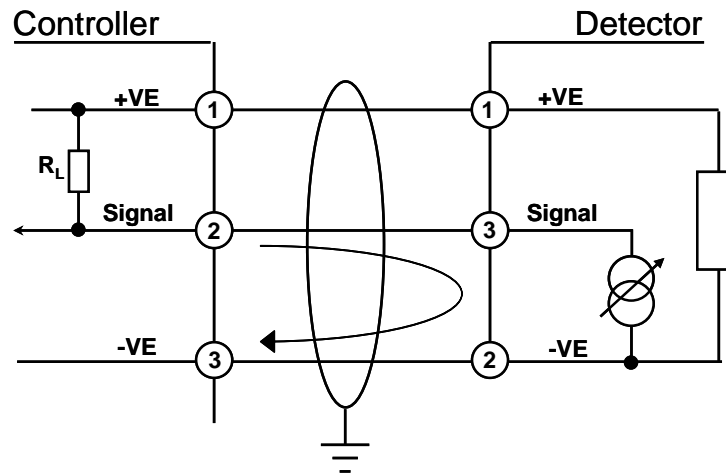
XCD Sink 3 Wire 4-20mA (Sink)

Note: Terminate cable screen at detector or controller, not both.
250ohm load resistor (RL) is installed in the factory, In case of connection with controller, this resistor should be removed because controller has load resistor internally.

6.2 Terminal connections

Note: Ensure that none of the wires in the terminal area cause an obstruction when refitting the Display Module. Ensure that the socket on the Display Module is fully engaged in the Display Module Connector on the Terminal Module.
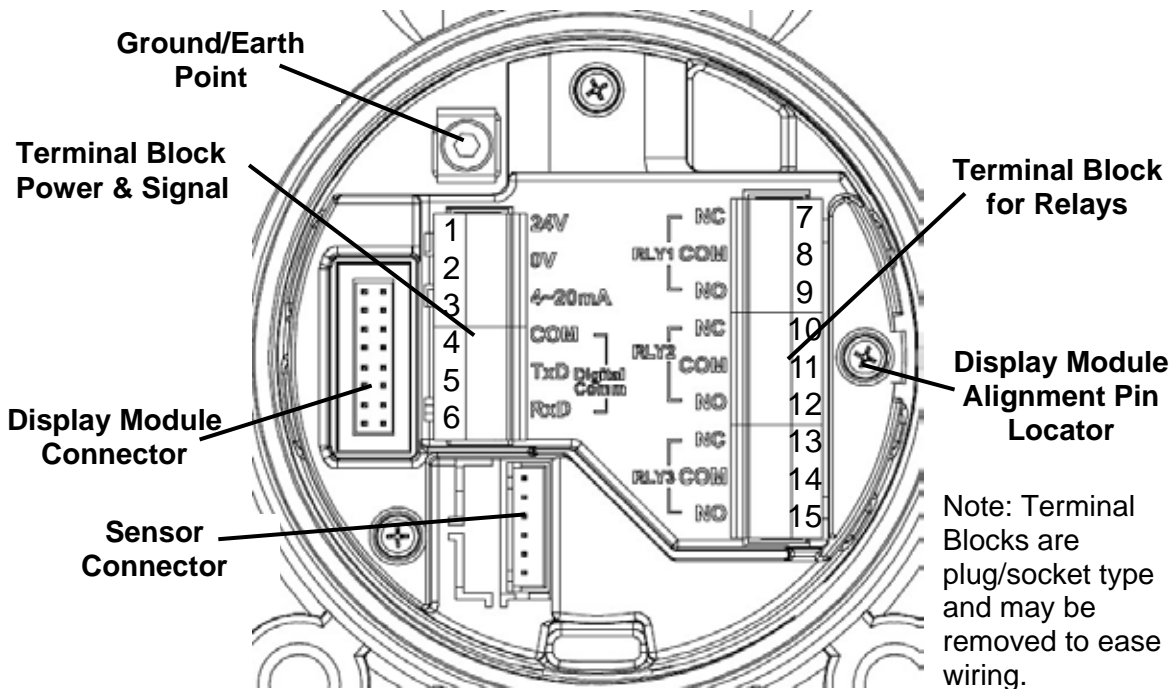

Diagram 7: Terminal module

Terminal Module Connections			
Terminal Number	**Marking**	**Connection**	**Description**
1	24V	+VE Supply	Controller Connections
2	0V	-VE Supply(0VDC)	
3	4~20mA	Current Output Signal	
4	COM	Drain	MODBUS RTU. RS485 (Optional)
5	TxD	MODBUS B (+)	
6	RxD	MODBUS A (-)	
7	RLY1/NC	Normally Closed	Programmable Relay 1 (Default A1)
8	RLY1/COM	Common	
9	RLY1/NO	Normally Open	
10	RLY2/NC	Normally Closed	Programmable Relay 2 (Default A2)
11	RLY2/COM	Common	
12	RLY2/NO	Normally Open	
13	RLY3/NC	Normally Closed	Programmable Relay 3 (Default Fault)
14	RLY3/COM	Common	
15	RLY3/NO	Normally Open	

Table 1: Transmitter terminal connections

6.3 Power

6.3.1. For ATEX/IECEx/AP Versions

The Sensepoint XCD transmitter (ATEX/IECEx/AP Versions) requires a power supply from the controller of between 16Vdc and 32Vdc. Ensure that a minimum supply of 16Vdc is measured at the sensor, taking into account the voltage drop due to cable resistance.

The maximum loop resistance in the field cable is calculated as follows:

$$R_{loop} = (V_{controller} - V_{detector\ min}) / I_{detector}$$

Example;

The controller is supplying a nominal 24Vdc **($V_{controller}$)**, the detector minimum allowable voltage is 16Vdc **($V_{detector\ min}$)**, therefore the maximum allowable voltage drop between the controller and detector is 8Vdc; this means a voltage drop of 4V in each core (+ve core and -ve core).
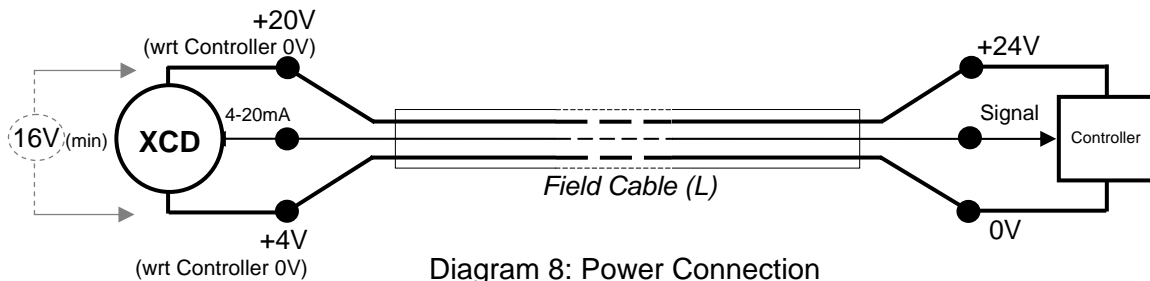
Diagram 8: Power Connection

Power consumption of the detector is 5.0W. The current required to drive the detector at the minimum voltage is (I = P / V), 5.0 / 16 = 312.5mA (I detector).

So, the maximum field cable loop resistance (R loop) = 8 / 0.31 = 26 Ohms, or 13 Ohms per core, (allowing for component variations, losses, etc.).

The following tables show the maximum cable distances between the controller and transmitter assuming a voltage drop of 4V in each core and for different cable parameters. The tables are examples only and actual cable parameters and source power supply voltage for the application should be used to calculate the maximum cable distance allowed at the installation site.

Typical cable data		Maximum Cable length (L)**	
Cable size (cross sectional area)	Cable resistance Ω/km (Ω/mi)	Meters	Feet
0.5mm^2 (20AWG*)	36.8 (59.2)	353	1158
1.0mm^2 (17AWG*)	19.5 (31.4)	666	2185
1.5mm^2 (16AWG*)	12.7 (20.4)	1023	3356
2.0mm^2 (14AWG*)	10.1 (16.3)	1287	4222
2.5mm^2 (13AWG*)	8.0 (12.9)	1621	5318
*nearest equivalent **example for 24Vdc supply voltage			

Table 2: Maximum cable distances

6.3.2. For UL/CSA Versions

The Sensepoint XCD transmitter (UL/CSA Versions) requires a power supply from the controller of between 12Vdc and 32Vdc. Ensure that a minimum supply of 12Vdc is measured at the sensor, taking into account the voltage drop due to cable resistance.

The maximum loop resistance in the field cable is calculated as follows:

$$R_{loop} = (V_{controller} - V_{detector\ min}) / I_{detector}$$

Example;

The controller is supplying a nominal 24Vdc ($V_{controller}$), the detector minimum allowable voltage is 12Vdc ($V_{detector\ min}$), therefore the maximum allowable voltage drop between the controller and detector is 12Vdc; this means a voltage drop of 6V in each core (+ve core and -ve core).
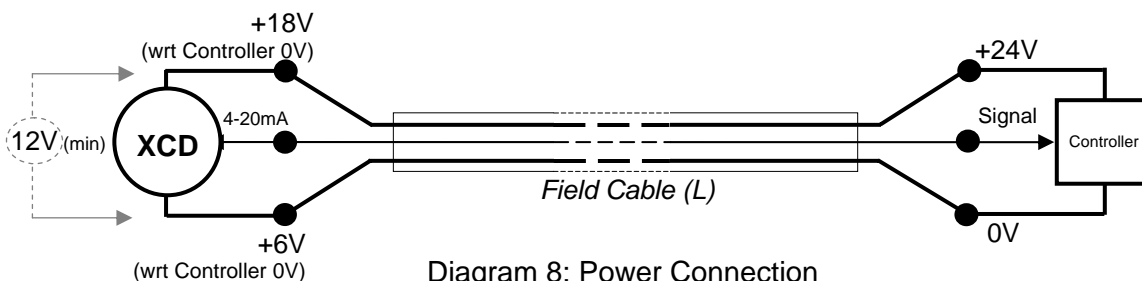

Diagram 8: Power Connection

Power consumption of the detector is 5.0W. The current required to drive the detector at the minimum voltage is ($I = P / V$), 5.0 / 12 = 416.7mA (I detector).

So, the maximum field cable loop resistance (R loop) = 12/0.42 = 28.8 Ohms, or 14.4 Ohms per core, (allowing for component variations, losses, etc.).

The following tables show the maximum cable distances between the controller and transmitter assuming a voltage drop of 4V in each core and for different cable parameters. The tables are examples only and actual cable parameters and source power supply voltage for the application should be used to calculate the maximum cable distance allowed at the installation site.

Typical cable data		Maximum Cable length (L)**	
Cable size (cross sectional area)	Cable resistance Ω/km (Ω/mi)	Meters	Feet
0.5mm^2 (20AWG*)	36.8 (59.2)	391	1284
1.0mm^2 (17AWG*)	19.5 (31.4)	738	2421
1.5mm^2 (16AWG*)	12.7 (20.4)	1134	3727
2.0mm^2 (14AWG*)	10.1 (16.3)	1426	4665
2.5mm^2 (13AWG*)	8.0 (12.9)	1800	5894
*nearest equivalent **example for 24Vdc supply voltage			

6.4 Cabling

> ***Caution: All unused and used cable/conduit entries must be sealed with a suitable certified sealing plug and cable gland.***

The use of industrial grade, suitably armoured field cable is recommended.

For example, screened 3 cores (plus screen 90% coverage), suitably mechanically protected copper cable with a suitable M20 explosion-proof gland, or ¾" NPT steel conduit, with 0.5 to 2.5 mm2 (20 to 13 AWG) conductors. Ensure the cable gland is installed correctly and fully tightened. All unused cable/conduit entries must be sealed with a suitable certified sealing plug (one plug is supplied).

Type	Cable Spec	Max Length
Modbus	AWM2464 AWG26~AWG12 Shield	1000meters

6.5 Cable and Earth/Ground regimes

Effective Earth/Ground bonding is important to ensure good EMC and RFI immunity.

The following diagrams show examples of how to earth/ground bond the cable at enclosures. The same principles apply to conduit installations. These bonding techniques provide good RFI/EMC performance. Earth/ground loops must be avoided to prevent the risk of false signal variation.
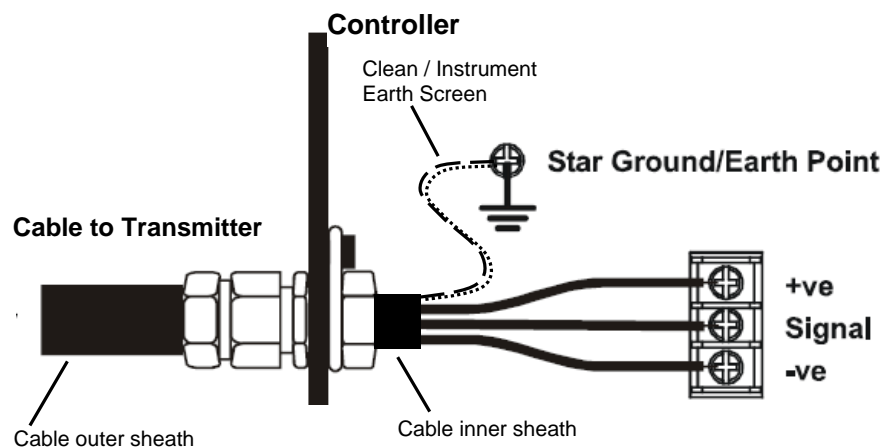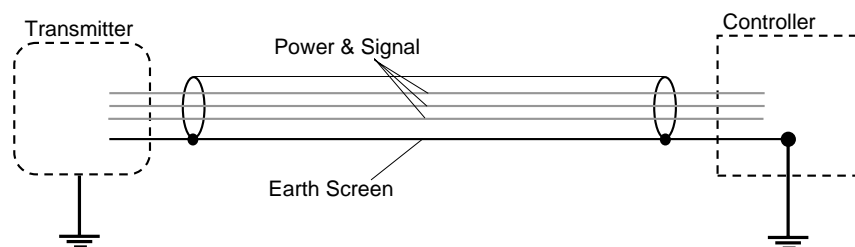

Diagram 9: Controller Grounding

Diagram 10: System grounding

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The Earth Screen of the field cable should be "tied to Earth" or connected to Ground at one point only. It is common practise to adopt a STAR EARTH connection regime where all instrumentation Screens are connected at one common point.
The Screen at the other end of the cable should be "parked" or terminated into a blank terminal.

The following diagrams show how to install the wire into the ground screw of the enclosure.

Loosen the bolt	Insert cable	Fasten the bolt

6.6 Ground Terminal Wiring

Internal Ground connection: Utilize the shield of the wiring cable recommended in the wiring instructions. For connection to this terminal. Twist the shield wire to avoid stray shield wires, Loosen the screw sufficiently and wrap the wire around the screw in a "U" shape. Raise the clamp and place the wire between the clamp and ground base, lower the clamp and tighten the screw to 6.9lb-in torque.

External Ground Connection: If required by local authority, Utilize a No 14 AWG copper, (Stranded or Solid), wire. Loosen the screw sufficiently to enable 'wrapping the wire around the screw in a "U" shape. Raise the clamp and place the wire between the clamp and ground base, lower the clamp and tighten the screw to10.4lb-in torque.

7 Default configuration

The Sensepoint XCD transmitter is supplied with the following default configuration.

Function	Value/Setting	Meaning
Sensor Type	Automatic according to Sensor type connected	XCD recognizes the XCD sensor cartridge according to the gas type within its own sensor family i.e. mV, EC or O_2 .
Signal output	≥0.0<1.0 mA	Fault (refer to table 5 section 12.3 for details)
	2.0 mA or 4.0 mA (17.4mA)	Inhibit (during configuration/user settings) For Oxygen, 2.0 mA or 17.4 mA
	4.0 mA to 20.0 mA	Normal gas measurement
	22.0 mA	Maximum over range
Alarm Relay 1*	Value is sensor dependant	Lower alarm level
	De-energized	Energizes on alarm
	Contact Normally Open (NO)	Closes on alarm
	Non-latching	
Alarm Relay 2*	Value is sensor dependant	Higher alarm level
	De-energized	Energizes on alarm
	Contact Normally Open (NO)	Closes on alarm
	Non-latching	
Fault Relay**	<1mA	Detector Fault
	Energized	De-energizes on alarm
	Contact Normally Open (NO)	Closes on alarm
	Non-latching	
Inhibit	2.0 mA (default) or 4.0 mA for Toxic and Flammable 2.0 mA (default) or 17.4 mA For Oxygen	Signal output inhibited during menu use. If any relay is set to inhibit relay, then inhibit relay will be activated.
Timeout	Disabled	No inhibit timeout. The detector waits for a button press before returning to the previous state/setting. Timeout period can be set in 'Configure Inhibit' menu in **Configuration Mode**.
Password	0000 (Disabled)	0000 (Password disabled). If changed then password is activated.
Location (Tag Number)	0000	Optional feature to identify the location or User's "Tag" number of the XCD
Temperature	°C	Option to have °C or °F
ModBus	ID, baud rates and Parity bit	ID : 1 Baud rates : 19,200 Parity bit : EVEN

* Alarm relays automatically reset when reading falls within alarm thresholds. If relay configured to LATCH, then relays must be reset using the Magnetic Wand.
** Fault state (fault relay and analogue output <1 mA) is always non-latching.

Table 3: Default configuration

Gas Name	Default Range	Lower Alarm	Lower Alarm Type	Higher Alarm	Higher Alarm Type
Oxygen	25.0%VOL	19.5%Vol	Falling	23.5%Vol	Rising
Hydrogen Sulfide	50.0ppm	10.0ppm	Rising	20.0ppm	Rising
Carbon Monoxide	300ppm	100ppm	Rising	200ppm	Rising
Hydrogen	1,000ppm	200ppm	Rising	400ppm	Rising
Nitrogen Dioxide	10.0ppm	5.0ppm	Rising	10.0ppm	Rising
Flammable IR	100%LEL	20%LEL	Rising	40%LEL	Rising
Flammable CAT	100%LEL	20%LEL	Rising	40%LEL	Rising
Carbon Dioxide IR	2.00%Vol	0.40%Vol	Rising	0.80%Vol	Rising

For details of how to change the configuration of the Sensepoint XCD please refer to section 13.

8 Normal Operation

Sensepoint XCD is supplied configured and ready for use according to the "Default Settings" table shown above. However these setting may be tailored to a specific application requirement using the Sensepoint XCD configuration menu system.

Access to the Sensepoint XCD transmitter's configuration menus system is via the Magnetic Activation Tool.

8.1 Display Screen

The Sensepoint XCD display features an LCD with Numeric and bar-graph gas concentration data, alpha-numeric warning and status indication, a target for magnetic switch activation and the UP/DOWN/ESC/ENTER zones for remote configuration. The LCD is also backlit with hi-intensity multi-colour LED indicator to show NORMAL, ALARM and FAULT status.

During normal operation the instrument display shows a steady GREEN backlight.

During Low and High Gas Alarm it displays a flashing RED backlight

During Fault condition the instrument display shows a flashing YELLOW backlight.

The screen is visible through the window of the transmitter's cover. The display shows the gas concentration (both graphically and numerically), range, units, alarm/ fault status, etc.

Note: The detector display may become sluggish in sub-zero temperatures and possibly unclear at temperatures below -40 °C, but the detector continues its gas monitoring function. The display is not damaged and recovers when the temperature increases.
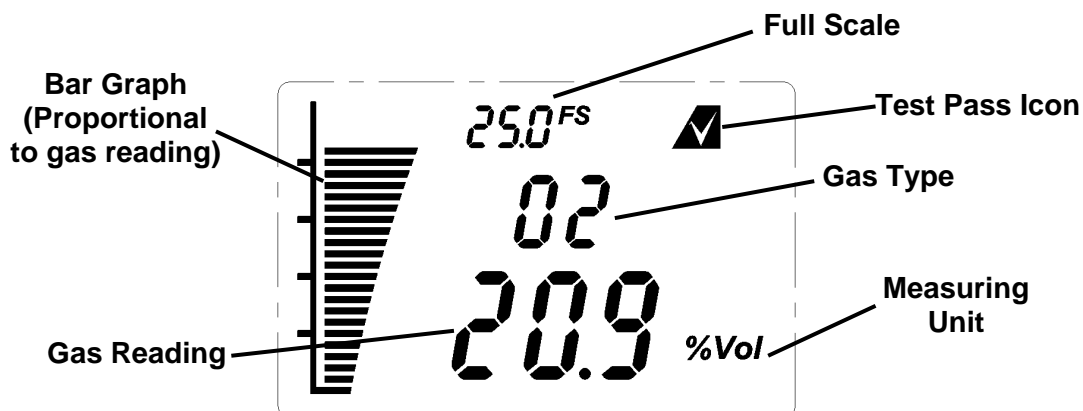
Diagram 11: Example of a O_2 Transmitter Display screen – Normal Operation

8.2 System Status

Display indications, current output and relay states for various operational conditions are shown in the following table. For further details of error messages and trouble shooting see section 12.3.

System Status						
Status	Display	Current Output	Relay			Back Light
			A1	A2	Fault	
Fault: Circuit or sensor error	F-XX fault number with fault icon blinking	0-1.0 mA			✓	Yellow, flashing
System Fault	N/A	0-0.15mA				
Note: In the event of processor failure the watchdog will automatically reset the system for recovery.						
Warning	W-XX warning number with fault icon blinking	Dependent on system status				Green Steady
Normal	0.0 Gas concentration	4-20 mA				Green Steady
Alarm 1	Gas concentration. 1st alarm icon blinking	4-20 mA	✓			Red, flashing
Alarm 2	Gas concentration. 2nd alarm icon blinking	4-20 mA	✓[1]	✓		Red, flashing
Over-range	Full scale icon and reading blinking	22mA	✓	✓[2]		Red, flashing
Inhibit	Inhibit icon dependent on Menu command. If any relay is set to inhibit relay, then inhibit relay will be activated.	2 or 4mA depending on configuration. Note: 2 or 17.4mA for Oxygen version				Green Steady

Table 4: System status

Note:
1. For Oxygen, A1 relay will not be activated because AL1 is configured to activate above 23.5 %Vol (in Rising Alarm configuration).

2. For Oxygen, A2 relay will not be activated because AL2 is configured to activate below 19.5 %Vol (in Falling Alarm configuration).

8.3 Magnetic Wand Activation

The magnetic wand is used as a tool to allow the user
to communicate with the Sensepoint XCD transmitter.
Communication with the XCD is achieved by positioning
the Magnetic Wand at one of three different positions on
the front glass window of the Sensepoint XCD transmitter.
Activation of the switches is verified by observing
the Magnetic Wand Activation Icon on the LCD display
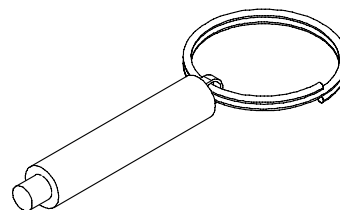
Hold the Magnetic Wand in position for up to 2 seconds   =   ●

Hold the Magnetic Wand in position for 3 seconds or more   =   ◉
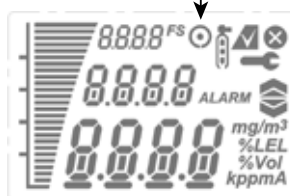
8.4 Mode Structure

Sensepoint XCD has 3 operating modes.

1. **Monitoring mode**, is the normal operating status while XCD measures and displays
   gas concentration. The fault/warning status is periodically checked, relay contacts
   are activated according to the configuration.

2. **Configuration mode**, this mode allows parameters relating to the configuration of
   the Transmitter functions to be changed according to specific needs. This mode can
   be protected by a password mechanism to prevent unauthorised changes being
   made.

3. **Review mode**, allows the user to view the current configuration settings.
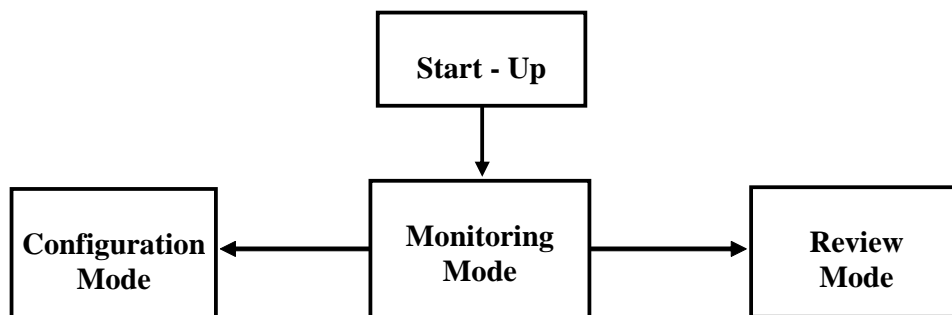
Diagram 12: Mode Structure

Further details of the information available and configuration options for the Sensepoint
XCD can be found in Section 13. of this manual.

9 First time switch on (Commissioning)

> ### WARNING
>
> *The following procedure requires the Transmitter Cover to be removed while carrying out supply voltage checks. Therefore the appropriate permits to work should be sought in preparation.*
>
> *Prior to carrying out any HOT WORK ensure local and site procedures are followed. Ensure that the associated control panel output actuation is inhibited so as to prevent false alarms.*

> *Caution: The following procedure should be followed carefully and only performed by suitably trained personnel*

Note: Calibration is mandatory before the detector can be used for gas monitoring. Refer to Section 10.1 Calibration for the proper procedure.

1. Remove the transmitter housing cover and detach the display unit by lifting the semi-circular handle and pulling the assembly directly away from the termination module (without twisting it)
2. Configure the detector's analogue output signal configuration for Current SINK or Current SOURCE operation using the selector switch located on the back of the display module. The default setting is Current SOURCE.
3. Check that all electrical connections are terminated correctly as per section 6.
4. Switch On the external power supply to the transmitter at the safe area gas detection controller (or PLC).
5. Using a Digital Multi Meter (DMM), check the Supply Voltage at the terminals 1 (24V) and 2 (0V), this should be a minimum supply voltage of 12Vdc or 16Vdc depending on the transmitter version (Maximum supply voltage is 32V DC)
6. Switch Off the external power to the detector.
7. Refit the Display Module and Cover.

Note: Ensure that none of the wires in the terminal area cause an obstruction when refitting the Display Module. Ensure that the socket on the Display Module is fully engaged in the Display Module Connector on the Terminal Module.

8. Switch On external power to the detector.
9. All the display icons/text/numbers are displayed for 3 seconds.
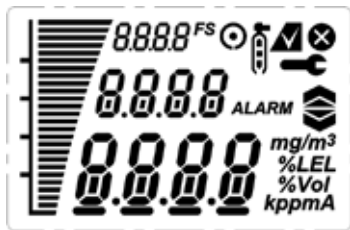
10. A start up sequence will then be displayed, similar to the one shown in Diagram 15.

Note:
For a full description of each screen shown in Diagram 15., please refer to Section 13.3
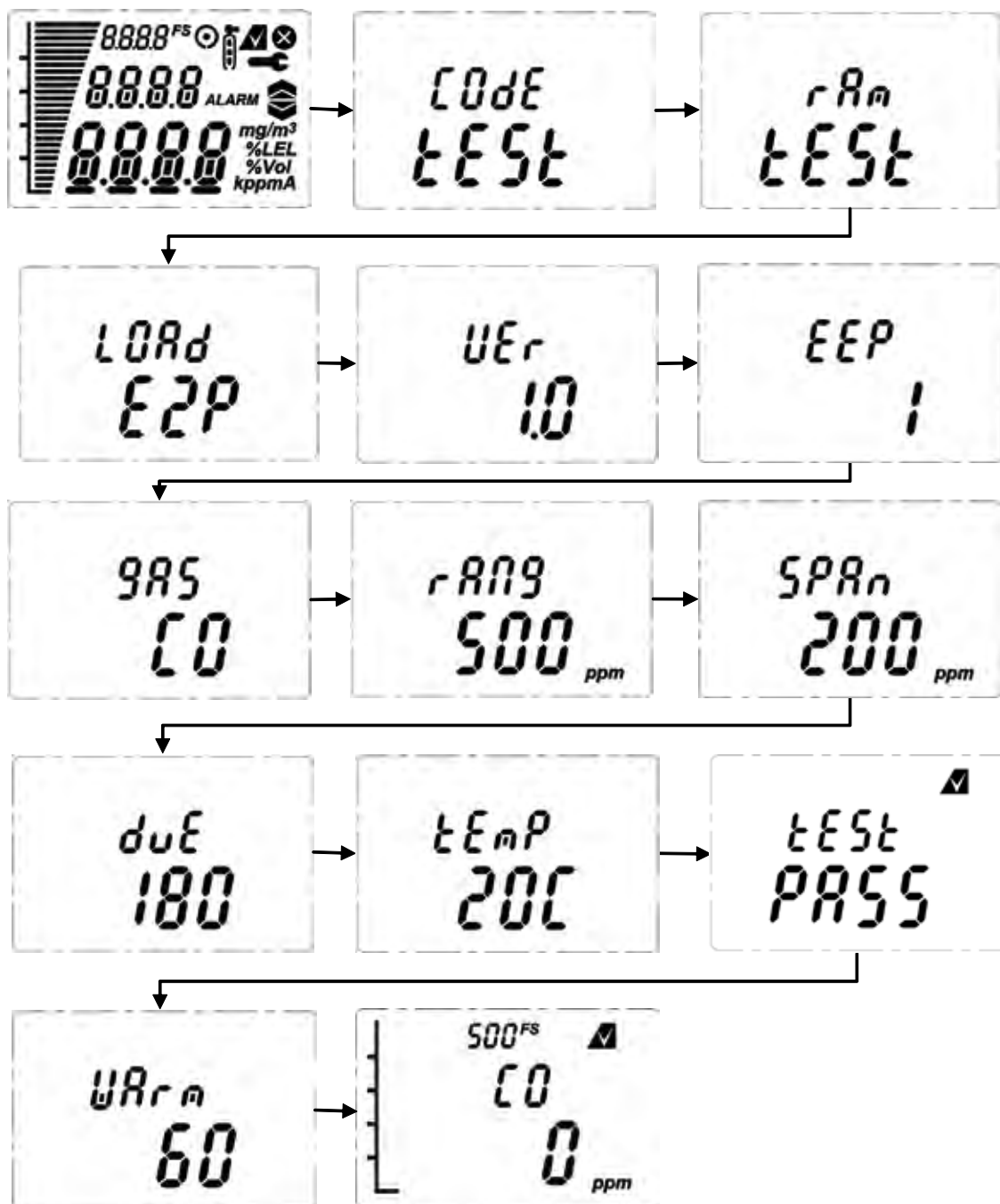"Review Mode" of this Manual.

Diagram 15: Normal Start up procedure (For the CO sensor version)

11. The warm up countdown of 60 seconds (depending on the gas type) is then
    displayed.

12. Normal **Monitoring Mode** is then resumed.

10 Response Check and Calibration

It is recommended to periodically carry out a gas response check on the Sensepoint XCD to ensure correct operation. This may be done in two ways;

1. A simple Response Check often referred to as a "BUMP TEST" is a test using calibration gas applied to the sensor via the nozzle of the Weather Protection or using the Sensepoint XCD Gassing Cap.
If a BUMP TEST is done via the Weather Protection nozzle it may be necessary in windy conditions to increase the flow rate of the test gas by a further 1 LPM, OR, to shelter the weather protection from the wind.

2. A full gas calibration of the sensor as described in the following section, using ONLY the Sensepoint XCD Gassing Cap (Part No.: S3KCAL).

10.1 Zeroing and span calibration

WARNING

As some calibration gases may be hazardous, ensure that outlets from gassing accessories exhaust safely.

Caution: Before initial calibration allow the detector to stabilize for 30 minutes after applying power. When in zeroing and span calibration mode the current output from the detector is inhibited (default 2mA) to avoid false alarms. For Flammable gas calibration use a calibration gas concentration of between 25%LEL and 75%LEL to ensure that the required accuracy can be attained. For Hydrogen Sulfide type sensors refer to section 10.1.2 before conducting zero and span calibration. For toxic sensors use a calibration gas of approximately 50%FSD.

To calibrate the detector, use an appropriate span gas cylinder, constant flow regulator AND the Sensepoint XCD Gassing Cap (see section 4.7). The flow rates used for calibration gas are as follows:

Gas Type	Flow rate (L / Min)
Air or N_2 for Zero	0.5 to 1.0
Flammable CAT	1 to 1.5
O_2	0.5 to 1.0
H_2S	0.5 to 1.0
CO	0.5 to 1.0
H_2	0.5 to 1.0
NO_2	0.5 to 1.0
Flammable IR	0.4 to 0.6
CO_2 IR	0.4 to 0.6

A compressed air cylinder (20.9%Vol oxygen) should be used to perform the zero calibration if the area where the detector is located contains any residual amount of the target gas. If no residual gas is present then the background air can be used to perform the zero calibration. Contact your Honeywell Analytics representative for details of suitable calibration kits.

To calibrate the detector follow the procedure below.

Note: the Oxygen sensor does not require a zeroing procedure. Background air (20.9%Vol oxygen) can be used to span the oxygen sensor in place of a compressed air cylinder (20.9%Vol oxygen). For oxygen sensors only do parts 1-4, 12, 13 (if compressed air cylinder is used), 14-17 and 22 of the procedure below.

(ZERO CALIBRATION)

WARNING

When calibrating the Flammable IR or CO$_2$ IR sensors, it is essential that the zero calibration is always followed by a span calibration. The zero calibration must never be done alone.

---

1. If the ambient air is NOT considered reliable to use to set the ZERO, then remove the weather protection and fit the Gassing Cap accessory (see Section 4.3) onto the sensor and apply a clean source of zero gas or compressed air.
2. To access the calibration menu, hold the end of the magnet over the switch located at the top center of the detector display (✓) for at least 3 seconds and then remove.
3. The display will indicate the first configuration mode menu 'SEt CAL'.

4. Put the magnet over the '✓' switch again and move to enter the Calibration menu.
5. The display will show the current gas reading, and the ' ⬍ ' icon flashes.

6. When the zero gas reading is stable use '✓' to confirm zero calibration.
7. If successful the display shows 'ZEro PASS' (if not successful, the display shows 'ZEro FAIL' and returns to configuration mode).
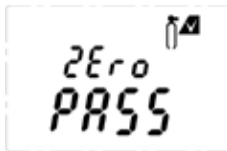
8. If using zero-air, turn it off. Zeroing is complete and saved.
9. The display shows 'SPAn' with 'YES' flashing.

10. If span calibration is required use '✓' proceed to the next step. If span calibration is not required, use '▲▼' to select 'No' and '✓' to return to configuration mode.

WARNING

When calibrating the Flammable IR or CO₂ IR sensors, it is essential that the span calibration is done after a zero calibration.
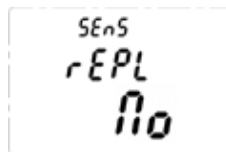

(SPAN CALIBRATION)

11. The display shows the current calibration span gas concentration while flashing the 'Ⅰ' icon. Use '▲▼' to change the calibration span gas concentration, and '✓' when required span calibration level is set.

$$9R5$$
$$200_{\ ppm}$$

12. The display will show the current gas reading, and the 'Ⅰ' icon flashes.

$$500^{FS}$$
$$C0$$
$$200_{\ ppm}$$

13. Connect the regulator to the span gas cylinder.

14. Apply the span gas to the sensor using the Sensepoint XCD Gassing Cap (see section 4.7 for description). The live gas reading is displayed. When the reading is stable, use '✓' to confirm span calibration.

15. If the sensor has been replaced the following display may be shown.

$$SEn5$$ $$SEn5$$
$$rEPL$$ $$rEPL$$
$$YE5$$ $$No$$

16. Use '▲▼' to select 'YES' if the sensor has been replaced or 'No' if it has not been replaced.

17. If the span calibration is successful the instrument will briefly display 'SPAn PASS' (if fails 'SPAN FAIL' displayed and returns to configuration mode).

Note: the calibration due warning counter is reset after a successful calibration.
See section 12.3 for further details of setting a calibration due warning.

SPAN
PASS

SPAN
FAIL

18. The display alternates between "Purg gAS" and the gas reading to indicate that the unit is expecting the span gas to be removed from the sensor.

Purg
gAS

500ᶠˢ
CO
200 ppm

19. Promptly switch off the calibration span gas and remove the Sensepoint XCD Gassing Cap from the sensor to allow the gas to disperse.

20. When the reading falls below 50% of the calibration gas level the display indicates a countdown (up to 180 seconds dependant on gas type).

Purg
45
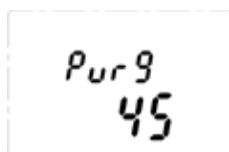
21. When the countdown is finished, the calibration procedure is complete.

22. The instrument returns to the 'Set CAL' menu. Activate the '▲' or '▼' switch to select another menu or select 'QuIT' to return to normal monitoring mode.

SEt
CAL

QuIt

Note: Remember to always replace the Weather Protection and other accessories.

10.2 Zeroing and span calibration of Hydrogen Sulfide sensors

Hydrogen Sulphide sensors can be affected by extreme humidity changes. A sudden increase in ambient humidity can result in a short-term positive drift in the instrument's reading. A sudden decrease in ambient humidity can result in a short-term negative drift in the instrument's reading. These are most likely to be noticed during calibration with dry or cylinder gas.

When calibrating Hydrogen Sulphide cartridges the following should be taken into account while following the procedure in 10.1:

1. To zero the sensor, use a compressed air cylinder of 20.9%Vol oxygen (not Nitrogen). Do not use background air.

2. Apply the gas to the sensor for three minutes before using '✓' to confirm the zero calibration.

3. If a span calibration is to be performed, the span calibration gas should be applied to the sensor immediately after the zeroing procedure. Do not allow the sensor to return to ambient air conditions between steps 2 and 3.

4. Apply the span gas for two minutes before using '✓' to confirm the span calibration.

11 General Maintenance

WARNINGS

Access to the interior of the transmitter, when carrying out any work, must only be conducted by trained personnel.

Care should be taken when removing and refitting the Sensepoint XCD plug-in Sensor Cartridge to the Sensor Socket so that damage to the connection pins can be avoided.

Before carrying out any work ensure local regulations and site procedures are followed. Appropriate standards must be followed to maintain the overall certification of the sensor and transmitter.

To reduce the risk of ignition of hazardous atmosphere, de-classify the area or disconnect the equipment from the supply circuit before opening the transmitter enclosure. Keep assembly tightly closed during operation.

Never attempt to open a junction box/enclosure or replace/refit the sensor in potentially hazardous atmospheres.

Take care when handling sensors as they may contain corrosive solutions.
Do not tamper with or in any way disassemble the sensor.
Do not expose to temperatures outside the recommended ranges.
Do not expose sensors under storage conditions to organic solvents or flammable liquids.

At the end of their working life, replacement electrochemical sensors for oxygen and toxic gas must be disposed of in an environmentally safe manner. Disposal should be according to local waste management requirements and environmental legislation.
Alternatively, old replaceable sensors may be securely packaged and returned to Honeywell Analytics clearly marked for environmental disposal.

Electrochemical sensors should NOT be incinerated as this action may cause the cell to emit toxic fumes.

Honeywell Analytics recommends that gas detectors are tested and re-calibrated on a six-monthly basis, or according to site practice. For remote Flammable or Toxic sensors used with the XCD Transmitter, please refer to the individual sensor manuals for specific recommended calibration periods. If a toxic sensor is exposed to a gas concentration significantly above the measuring range it shall be calibrated as soon as possible afterwards.

11.1 Operational Life

The pellistors used in the Catalytic flammable gas sensor can suffer from a loss of sensitivity when in the presence of poisons or inhibitors, e.g. silicones, sulphides, chlorine, lead or halogenated hydrocarbons. The pellistors are poison resistant to maximize the operational life of the Catalytic flammable sensor. A typical operating life, subject to the presence of poisons/inhibitors is 36 months.

The NDIR (infrared) flammable gas sensor is not affected by the above-mentioned poisons and therefore has a longer life span. A typical operating life is 5 years.

Typical life of a toxic gas sensor is dependant on the application, frequency and amount of gas exposure. Under normal conditions (3 monthly visual inspection and 6 monthly test/re-calibration), the XCD Oxygen and other toxic sensors have an expected life equal to or greater than 24 months.

Refer to section 12 for sensor replacement procedures.

Caution: Oxygen deficient atmospheres (less than 6%V/V) may result in inaccuracy of reading and performance.

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12 Servicing

WARNINGS

Take care when handling sensors as they may contain corrosive solutions. Do not tamper or in any way dis-assemble the sensor. Do not expose to temperatures outside the recommended range. Do not expose sensor to organic solvents or flammable liquids.

Care should be taken when removing and refitting the Sensepoint XCD plug-in Sensor Cartridge to the Sensor Socket so that damage to the connection pins can be avoided.

At the end of their working life, replacement electrochemical sensors for oxygen and toxic gas must be disposed of in an environmentally safe manner. Disposal should be according to local waste management requirements and environmental legislation. Alternatively, old replaceable sensors may be securely packaged and returned to Honeywell Analytics clearly marked for environmental disposal.

Electrochemical sensors should NOT be incinerated as this action may cause the cell to emit toxic fumes.

Caution: The following procedure should be followed carefully and only performed by suitably trained personnel.
A fault condition will be signalled by the detector if the sensor is removed with the unit under power.

12.1 Sensor replacement

The Flammable Catalytic and Toxic ECC sensor cartridge that are used with the Sensepoint XCD Sensor Socket have no serviceable parts. When they have reached the end of their operational life, simply replace the cells.
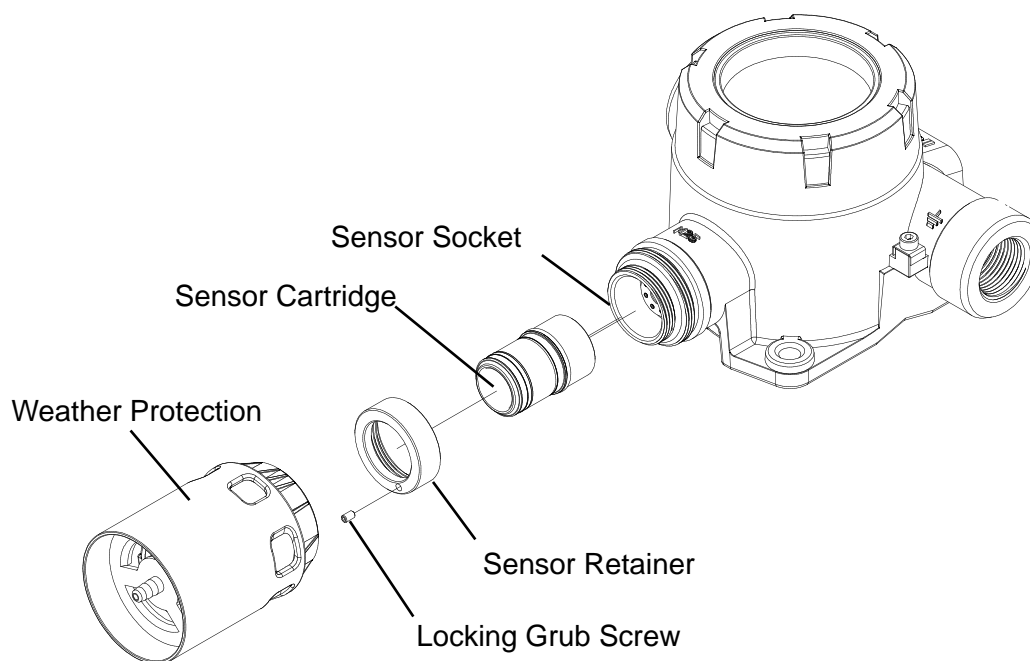
Diagram 13: Sensor Replacement

To replace the plug-in sensor of a Sensepoint XCD Sensor Socket use the following procedure:

1. **Important:** Remove the Power from the Sensepoint XCD Transmitter

2. Remove the Weather Protection or other accessories from the sensor socket thread.

3. Loosen the Locking Grub Screw and unscrew the Sensor Retainer

4. Carefully pull the old Sensor from the sensor socket without twisting.

5. Fit the new Sensor in its place

6. Calibrate sensor

WARNING

Ensure that the same Gas Type and Range of Sensor is fitted in place of the old Sensor.

Care should be taken when removing and refitting the Sensepoint XCD plug-in Sensor Cartridge to the Sensor Socket so that damage to the connection pins can be avoided.

The sensor head must be fitted with the supplied weather protection, and mounted so that the sinter is pointing downward to provide ingress protection IPX6.

The weather protection is a potential electrostatic charging hazard. The manufacturer's instructions should be observed.

12.2 Replacing Modules within the Transmitter

Two replaceable module assemblies are located within the transmitter housing. The Display Module and the Terminal Module.

The Display Module is simply removed by unplugging it from the Terminal Module (this procedure is done during normal installation).

To replace the Terminal Module, use the following procedure:

1. Unscrew and remove the Transmitter Cover

2. Lift the handle and un-plug and remove the Display Module.

3. Unplug the connection terminals and lift them clear of the Terminal Module.

4. Unplug the connector for the XCD sensor.

5. Loosen and remove the three "cross-headed" screws that secure the Terminal Module to the Transmitter housing.

6. Carefully lift the Terminal Module from the transmitter housing.

7. Fit the new Terminal Module using the above procedure in reverse order.
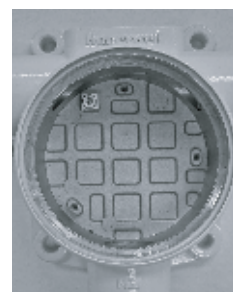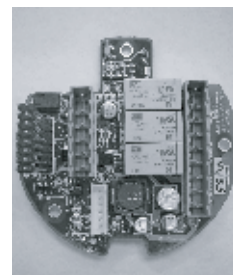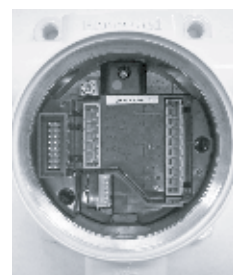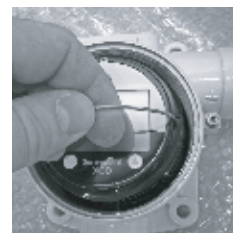
12.3 Faults and Warnings

The table below provides details of possible error.

Message	Description	Action
W-01	Calibration needed	The unit has not been calibrated for the configured calibration interval Calibration is necessary due to change of sensor/gas type
W-02	Transmitter Temperature limits exceeded	Use '✓' to clear when within limits
W-03	Alarm setting needs to be configured	Re-configure alarm settings such that upper alarm should not exceed user configured scale
W-04*	Over-range warning	Use '✓' to clear when within limits
W-05*	The sensor is switched off to prevent it from being deteriorated	Make sure that there is no flammable gas in the air and use '✓' to clear when within limits
F-01	Internal I2C failure	Cycle power to detector. Replace detector
F-02	Cell failure	For Toxic, replace sensor For Flammable/IR, cycle power to detector. Replace sensor
F-03	Significant zero drift	Re zero/calibrate
F-04	Unexpected sensor fitted	Replace sensor
F-05	EEPROM is corrupted	Reset transmitter. If fault still appear, replace transmitter
F-06	Low supply voltage	Reset transmitter. If fault still appear, replace transmitter
F-07	SRS processor failure	Reset transmitter. If fault still appear, replace transmitter
F-08	RAM read/write fault	Reset transmitter. If fault still appear, replace transmitter
F-09	Info. memory corrupted	Reset transmitter. If fault still appear, replace transmitter
F-10	Code Memory corrupted	Reset transmitter. If fault still appear, replace transmitter
F-11	DAC output failure	Check load resistor or sink/source mode switch was configured properly
F-12	Heater failure	Reset transmitter. If fault still appear, replace transmitter
F-13	Supplied voltage failure	Check supply voltage. Replace detector

*Note : W-04 and W-05 are only for flammable catalytic bead sensors. For other gases, gas reading will blink on the LCD instead of the over-range warning.

Table 5: Fault and Warning List

13 Menu's and Advanced Configuration

13.1 Abort Function

In Review Mode or Configuration Mode the user can escape one step back from the current position using the Abort Function. To do this the user must activate the Enter switch for more than 3 seconds with the Magnetic Wand. Switching between each pair of modes or between menus and sub menus are shown in the following table.

From	To	Example
Review Mode	Monitoring Mode	Activate Enter switch for more than 3 seconds while in Review Mode
Configuration Mode	Monitoring Mode	Activate Enter switch for more than 3 seconds while navigating menus in the Configuration Mode
Configuration Mode sub menu	Configuration Mode main menu	Activate Enter switch for more than 3 seconds while in a sub menu

Table 6: Transmitter menu switching

13.2 Configuration Mode

The table below shows the functions available via the configuration menu that can be displayed on the transmitter and accessed using the Magnetic Wand.
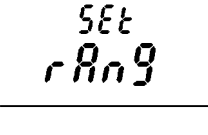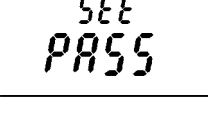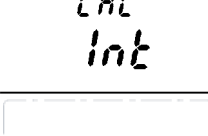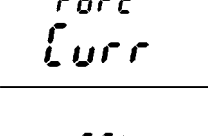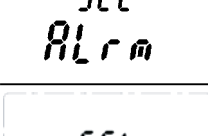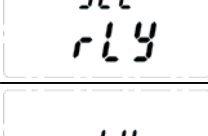
The instrument will show the main Menu when the "Enter" switch is activated with the Magnetic Wand and held for at least 3 seconds.

The Menu is password protected to prevent any unauthorized changes. The password is initially disabled and the default password is '0000'. If the default password is changed to other than '0000', then the password is enabled automatically and requested when entering Configuration Mode.

With the Menu showing, the following functions can be performed: calibration, bump test, sensor selection and configuration of parameters such as measuring range, calibration gas level, calibration interval, inhibit current, inhibit timeout, alarm setting, relay setting, password change, location setting, temperature unit reading, force analogue output and alarm function checks.

While in Configuration mode, the output current of the transmitter is inhibited to prevent false alarms.

Names, displays and descriptions for each menu item in Configuration Mode are shown in the following table.

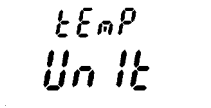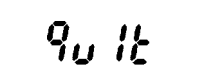| Menu	Display	Description
Set Calibration	*SEt CAL*	Execute zero/span calibration Set calibration gas level After zero, the option exists to proceed with span calibration, or return to the Menu.
Select Sensor	*SEL SENS*	Select the type of sensor from the sensor list. This menu is only available for flammable / IR sensor.
Select Gas	*SEt gAS*	Select the type of gas from the list. This menu is only available for flammable / IR sensor.
Set Range	*SEt rAng*	Set measuring range
Configure Inhibit *Note 1*	*Conf Inhb*	Select inhibit current Set timeout option (5 minute increments)
Set Password	*SEt PASS*	Enable/disable password Set password Default – no password (Select '0000')
Set Calibration Interval	*CAL Int*	Set calibration interval, 30 to 365 days User configurable option to display warning
Bump Test	*bumP tESt*	Execute a 'bump' test to check gas response of the sensor.
Force Current	*forc Curr*	Force analogue output to test functionality of GD control system during system commissioning.
Set Alarms *Note 2*	*SEt ALrm*	Set alarm 1, alarm 2 levels, functionality and operation (none/falling/rising)
Set Relays *Note 2*	*SEt rLy*	Set relay 1,2,3 type (alarm 1, alarm 2, fault and inhibit) and action (energized/de-energized)
Relay Operation *Note 2*	*rLy OPr*	Configure relay on delay time, relay off delay time and latch/non-latch

Set Location	$5Et$ Loc	Set location (or TAG number)
Set Temperature Unit	$tEmP$ $Un It$	Change temperature display unit. °C (Celcius) or °F (Fahrenheit)
Check Alarm functions	$tE5t$ $ALrm$	Simulate alarm situation to check the alarm system without gas present at the sensor
Quit	$9u It$	Return to Monitoring mode

Table 7: Transmitter menu descriptions

Note 1: To comply with IEC EN 60079-29-1 and EN 50104, if the Inhibit current is set to 4 mA, the timeout option must be set. The maximum value for the timeout is 15 minutes.

Note 2: To comply with IEC EN 60079-29-1 and EN50104, the alarms must be configured as latching by setting the corresponding relay to latching, even if the relay is not being used. If relays are used the action must be configured as "energized" for fail safe operation.
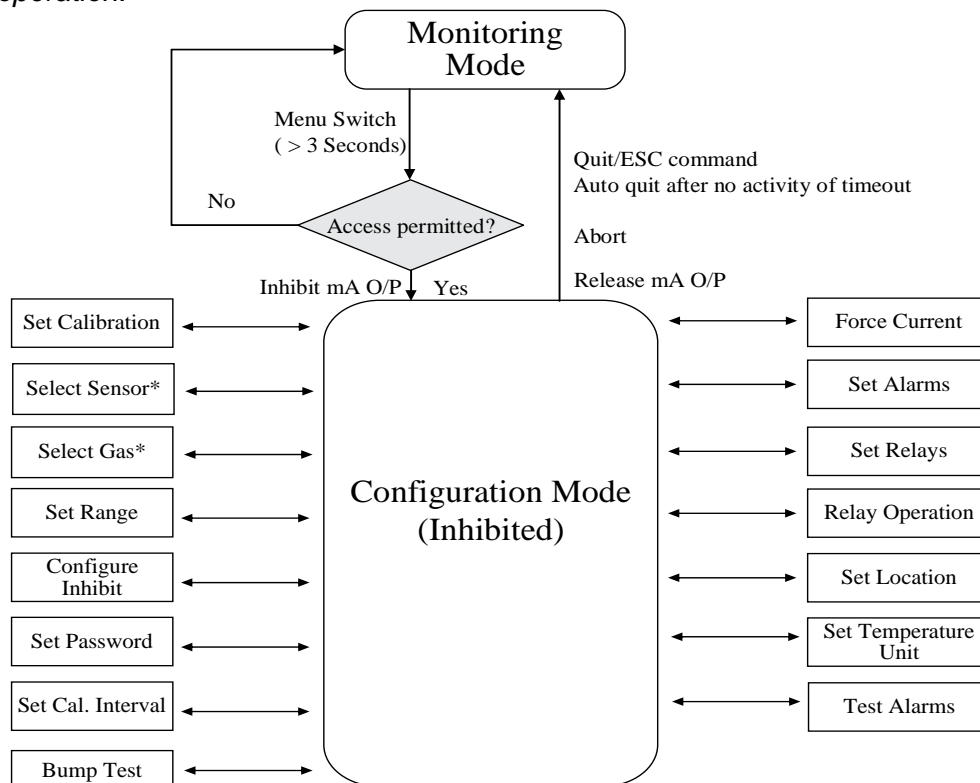
* Note : "Select Sensor" and "Select Gas" menus are only available for flammable/IR sensors.
Diagram 14: Configuration Mode

13.2.1 Configuration mode operation table

Configuration mode allows the user to perform calibration and configure parameters such as full scale range, calibration gas level, calibration interval, inhibit current & timeout, alarm settings, relay settings, set a password, etc. To activate Configuration mode hold the magnet over the ENTER switch for at least 3 seconds and then remove. Configuration mode can be password protected to prevent unauthorized personnel from changing parameters. Initially the password is set to '0000' meaning it is disabled. While in Configuration mode, the output current of the detector is inhibited to prevent false alarms.
Use the table below to help navigate the menus and make configuration changes. The menus are shown in the left hand column. Use ▲▼ to select the required menu and '✓' to enter. Follow the information and instructions in the table from left to right from the required menu.

▲▼	OK	▲▼	OK	▲▼	OK	▲▼	OK	▲▼
SEt CAL[1]	✓	GAS NAME, ZERO CONCENTRATION AND FLASHING '' ICON DISPLAYED. APPLY ZERO GAS AND USE '✓' WHEN READING IS STABLE. 'ZEro PASS' DISPLAYED IF OK, 'ZEro FAIL' IF NOT.	⇧	'SPAN' DISPLAYED AND 'YES' FLASHING TO ASK IF YOU NOW WANT TO PERFORM SPAN CALIBRATION. USE '✓' TO PROCEED OR USE ▲▼ TO SELECT 'No' AND RETURN TO MENU MODE.	✓	'GAS' TARGET CONCENTRATION FLASHING AND ⓘ ICON DISPLAYED. USE ▲▼ TO CHANGE GAS CONCENTRATION AND '✓' TO START SPAN CALIBRATION.	✓	GAS NAME, CURRENT CONCENTRATION AND FLASHING ⓘ ICON DISPLAYED. APPLY SPAN GAS AND USE '✓' WHEN READING STABLE. IF OK 'PASS' & 'PurG' DISPLAYED (IF FAIL 'SPAN FAIL' DISPLAYED AND RETURNS TO MENU). REMOVE SPAN GAS. WHEN READING <50% OF SPAN POINT, COUNTDOWN BEGINS & UNIT RETURNS TO MENU MODE.
SEL[2] **SENS**	✓	'SEnS' DISPLAYED WITH SENSOR TYPE DISPLAYED. USE ▲▼ TO SELECT DIFFERENT SESNOR.	✓	IF SENSOR TYPE IS CHANGED, 'CAL YES' DISPLAYED TO ASK IF YOU NOW WANT TO PERFORM CALIBRATION. USE '✓' TO PROCEED OR USE ▲▼ TO SELECT 'No' AND RETURN TO MENU MODE.					
SEL 9AS[2]	✓	'9AS' DISPLAYED WITH GAS TYPE DISPLAYED. USE ▲▼ TO SELECT DIFFERENT GAS.	✓	IF GAS TYPE IS CHANGED, 'CAL YES' DISPLAYED TO ASK IF YOU NOW WANT TO PERFORM CALIBRATION. USE '✓' TO PROCEED OR USE ▲▼ TO SELECT 'No' AND RETURN TO MENU MODE.					
SEt rAn9	✓	BAR GRAPH INDICATING CURRENT RANGE, 'rAn9' DISPLAYED & CURRENT RANGE FLASHES. USE ▲▼ TO SELECT DIFFERENT RANGE	✓	IF RANGE IS CHANGED, 'CAL' DISPLAYED AND 'YES' FLASHING TO ASK IF YOU NOW WANT TO PERFORM CALIBRATION. USE '✓' TO PROCEED OR USE ▲▼ TO SELECT 'No'.	✓	IF RANGE IS CHANGED, 'ALrm' DISPLAYED AND 'YES' FLASHING TO ASK IF YOU NOW WANT TO MODIFY ALARM SETTINGS. USE '✓' TO PROCEED OR USE ▲▼ TO SELECT 'No' AND RETURN TO MENU MODE.	✓	UNIT RETURNS TO MENU MODE
ConF Inhb[4]	✓	'Inhb' DISPLAYED WITH ⟷ ICON FLASHING. CURRENT INHIBIT mA VALUE FLASHES. USE ▲▼ TO SELECT NEW VALUE (2 OR 4mA TOXICS, OR 2 OR 17.4mA OXYGEN VERSION).	✓	'tImE' DISPLAYED WITH ⟷ ICON. FLASHING CURRENT INHIBIT TIMEOUT PERIOD (MINUTES) FLASHES. USE ▲▼ TO SET NEW TIMEOUT. (IF SET TO 0 OUTPUT IS PERMANENTLY INHIBITED)	✓	UNIT RETURNS TO MENU MODE		
SEt PASS	✓	'PASS' DISPLAYED WITH FIRST FIRST DIGIT PLACE ICON OF THE PASSCODE FLASHING. USE ▲ TO SELECT 1ST DIGIT OF CURRENT PASSWORD. USE ▼ TO MOVE TO NEXT DIGIT AND SET REST OF PASSCODE.	✓	UNIT RETURNS TO MENU MODE					

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Menu		Step 1		Step 2		Step 3		Step 4
Forc Curr	✓	'Forc' DISPLAYED WITH ⊑' ICON. DEFAULT FORCE CURRENT '4.00' FLASHES. USE ▲▼ TO CHANGE TO REQUIRED mA LEVEL.	✓	UNIT TRANSMITS THE CURRENT IF YOU WANT TO EXIT FROM THIS MENU, USE ABORT FUNCTION				
CAL Int3[3]	✓	'Int' DISPLAYED WITH CURRENT CALIBRATION INTERVAL FLASHING. USE ▲▼ TO CHANGE INTERVAL.	✓	'duE' DISPLAYED AND 'No', 'LCd' OR 'ALL' FLASHING. USE ▲▼ TO SELECT REQUIRED CAL DUE WARNING OUTPUT.	✓	UNIT RETURNS TO MENU MODE		
bumP tESt	✓	PEAK READING DISPLAYED WITH OUTPUT INHIBITED ⊑' ICON AND PEAK STRING FLASHING. APPLY BUMP TEST GAS AND CHECK PEAK READING ON DISPLAY.	✓	CURRENT GAS CONCENTRATION DISPLAYED WITH OUTPUT INHIBITED ⊑' ICON FLASHING.	✓	UNIT RETURNS TO MENU MODE WARNING: DO NOT RETURN TO NORMAL MODE UNTIL CURRENT GAS CONCENTRATION HAS FALLEN BELOW A1 LIMIT OR THE DETECTOR WILL GIVE AN ALARM		
SEt ALrm	✓	'AL1', ICON DISPLAYED AND CURRENT ALARM LEVEL 1 CONCENTRATION FLASHES. USE ▲▼ TO CHANGE TO REQUIRED CONCENTRATION LEVEL.	✓	'AL1' DISPLAYED WITH 'NonE', 'riSE' OR 'FALL' FLASHING. USE ▲▼ TO SELECT REQUIRED ALARM ACTION.	✓	'AL2', ICON DISPLAYED AND CURRENT ALARM LEVEL 2 CONCENTRATION FLASHES. USE ▲▼ TO CHANGE TO REQUIRED CONCENTRATION LEVEL.	✓	'AL2' DISPLAYED WITH 'NonE', 'riSE' OR 'FALL' FLASHING. USE ▲▼ TO SELECT REQUIRED ALARM ACTION AND USE √ TO RETURN TO MENU MODE.
Set rLY5[5]	✓	'rL1' DISPLAYED AND 'AL1', 'AL2', 'Inht' or 'FLt' FLASHES. USE ▲▼ TO CHANGE TO REQUIRED RELAY TARGET.	✓	'rL1' DISPLAYED AND 'dEEn' or 'Enr9' FLASHES. USE ▲▼ TO CHANGE TO REQUIRED RELAY ACTION.	✓	'Rl2' DISPLAYED AND 'AL1', 'AL2', 'Inht' or 'FLt' FLASHES. USE ▲▼ TO CHANGE TO REQUIRED RELAY TARGET.	✓	'rL2' DISPLAYED AND 'dEEn' or 'Enr9' FLASHES. USE ▲▼ TO CHANGE TO REQUIRED RELAY ACTION.
	✓	'rL3' DISPLAYED AND 'AL1', 'AL2', 'Inht' or 'FLt' FLASHES. USE ▲▼ TO CHANGE TO REQUIRED RELAY TARGET.	✓	'rL3' DISPLAYED AND 'dEEn' or 'Enr9' FLASHES. USE ▲▼ TO CHANGE TO REQUIRED RELAY ACTION.	✓	UNIT RETURNS TO MENU MODE		
rlY OPr5[5]	✓	'rLY', 'ON' DISPLAYED AND CURRENT RELAY-ON TIME FLASHES. USE ▲▼ TO CHANGE TO REQUIRED RELAY-ON DELAY.	✓	'rLY', 'OFF' DISPLAYED AND CURRENT RELAY-OFF TIME FLASHES. USE ▲▼ TO CHANGE TO REQUIRED RELAY-OFF DELAY.	✓	'Ltch' DISPLAYED AND 'YES' or 'No' FLASHES. USE ▲▼ TO CHANGE TO REQUIRED LATCH OPTION.	✓	UNIT RETURNS TO MENU MODE
Set Loc	✓	'Loc' DISPLAYED WITH FIRST 4 CHARACTERS OF THE LOCATION STRING. USE ▼ TO CHANGE THE 1ST CHARACTER OF CURRENT LOCATION STRING. USE ▲ TO MOVE TO NEXT CHARACTER AND SET REST OF STRING. MAXIMUM 12 CHARACTERS CAN BE SET.	✓	'Loc' DISPLAYED NEW LOCATION STRING. THE STRING MOVES RIGHT-TO-LEFT TO SHOW WHOLE CHARACTERS TWICE. THEN UNIT AUTOMATICALLY RETURNS TO MENU MODE.				
tEmP Unlt	✓	'tEmP' DISPLAYED WITH '°C' OR '°F' FLASHING. USE ▲▼ TO CHANGE TO REQUIRED TEMPERATURE UNIT.	✓	UNIT RETURNS TO MENU MODE				
tESt ALrm	✓	'Forc' DISPLAYED and 'AL1' FLASHING TO SELECT TEST-REQUIRED ALARM. USE √ TO FORCE ALARM1.	✓	GAS NAME, CURRENT GAS CONCENTRATION DISPLAYED AND ⊑' ICON AND AL ICON FLASHE.	✓	UNIT RETURNS TO MENU MODE		
9ult	✓	QUITS MENU MODE AND RETURNS TO MONITORING MODE						
▲▼ OK	OK	▲▼	OK	▲▼	OK	▲▼	OK	▲▼

[1] Refer to section 10.1 for detailed zero and span calibration procedures. A detector fitted with an oxygen sensor will skip the zeroing procedure. Re-calibrate the detector if left un-powered for periods in excess of 24 hours.

[2] This menu is only available and visible when the unit is fitted with flammable/IR sensor.

[3] The calibration due warning counter is automatically reset after a successful calibration.

[4] To comply with IEC EN 60079-29-1 and EN 50104, if the Inhibit current is set to 4 mA, the timeout option must be set. The maximum value for the timeout is 15 minutes.

[5] To comply with IEC EN 60079-29-1 and EN50104, the alarms must be configured as latching by setting the corresponding relay to latching, even if the relay is not being used. If relays are used the action must be configured as "energized" for fail safe operation.

13.3 Sensor / Gas Selection

NOTE:
This Configuration option is not available for XCD units with EC sensors

13.3.1 Sensor Selection

"Select Sensor" sets the identity of the type of mV sensor attached to the XCD when XCD does not detect the sensor type automatically. when sensor type is detected by XCD automatically, the current sensor type can be confirmed in this menu.

The available mV sensors:

Ir-1	NDIR Infrared CO_2 0-2%Vol
Ir-3	NDIR Infrared Methane 0-100%LEL
Ir-4	NDIR Infrared Propane 0-100%LEL
Cb-1	Catalytic 0-100%LEL

13.3.2 Gas Selection

Use "SEL gAS" to set the target gas for sensors capable of detecting multiple gases. The available gases:

Sensor type	Gas type	Gas Name displayed
Ir-1	CO_2	CO_2
Ir-3	mEt	mEt
Ir-4	Propane	PrO
Cb-1	Str1 to Str8	FLM

Gas selection is dependent on the type of sensor attached to the XCD. If Ir-1/Ir-3/Ir-4 sensor is attached, then gas type is detected by XCD automatically like CO_2/mEt/ProP gas.. But when Cb-1 sensor is attached to the XCD, a user can select the gas from Str1 (1*) to Str8 (8*). For more information on star rating, please refer to section 19.2.

Note: For standard calibration (calibration gas = target gas) the following parameters are to be used:
Methane   Star Rating 6 Gas Str 6   100 %LEL = 4.4 %v/v*
Propane   Star Rating 5 Gas Str 5   100 %LEL = 1.7 %v/v*

The current configuration of the XCD is displayed and by using the '✓' switch to enter "SEL gAS" menu. To select a flammable gas, use '▲▼' to move through the list, then use '✓' to make the selection or abort function to discard the selection and return to menu mode.
If type of gas is changed, calibration prompt will appear to ask if you want to perform calibration.

```
  SEL          gAS          SEL          gAS
  gAS          Str1         gAS          CO2


               gAS
               Str2         SEL          gAS
                 ⋮          gAS          mEt

               gAS
               Str8
```
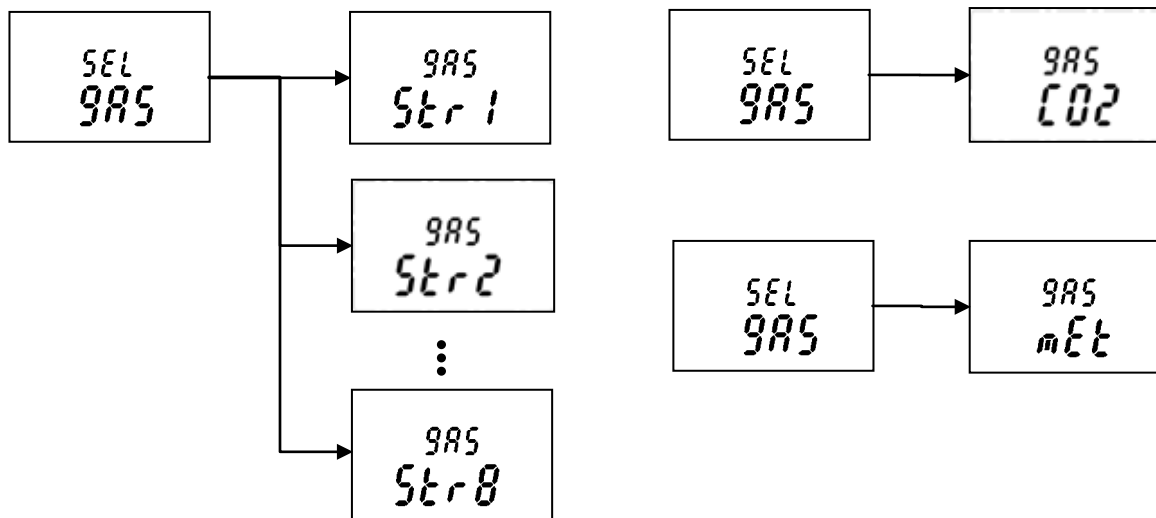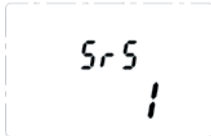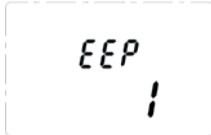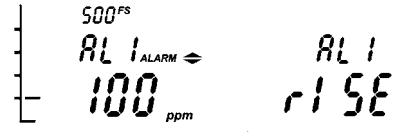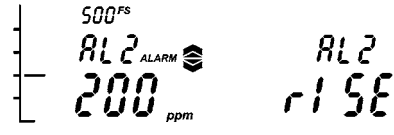
Diagram 16: Gas Selection

13.4 Review Mode

The instrument will enter Review mode when the "Enter" switch is activated with the Magnetic Wand and held for around one second.

Names, displays and descriptions for each review item in Review Mode are shown in the following table.

Item name	Display	Description
Software version	*UEr 1*	S/W version of transmitter
SRS version	*SrS 1*	S/W version of SRS (watch dog)
EEP version	*EEP 1*	EEPROM parameter version
Gas	*9AS CO*	Gas type
Measuring range	*rAn9 300 ppm*	A user selected measuring range
Calibration level	*SPAn 200 ppm*	Calibration gas level
Calibration due	*duE 180*	Estimated time to next calibration
Alarm 1	*500 FS / AL 1 ALARM / 100 ppm* *AL 1 rISE*	Alarm settings for Alarm 1
Alarm 2	*500 FS / AL 2 ALARM / 200 ppm* *AL 2 rISE*	Alarm settings for Alarm 2

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Location	Loc 0000	Location in which the transmitter is installed
Power	Powr 24.0U	Power voltage*
Temperature	tEmP 20C	Internal Transmitter temperature*
Peak conc.	PEAK 0 ppm	Maximum concentration detected up to now
Test Result	tESt PASS	There is no fault detected.

Table 8: Transmitter menu descriptions

Note:
*Power voltage and internal transmitter temperature may be different from actual value due to measuring accuracy and internal heating components.
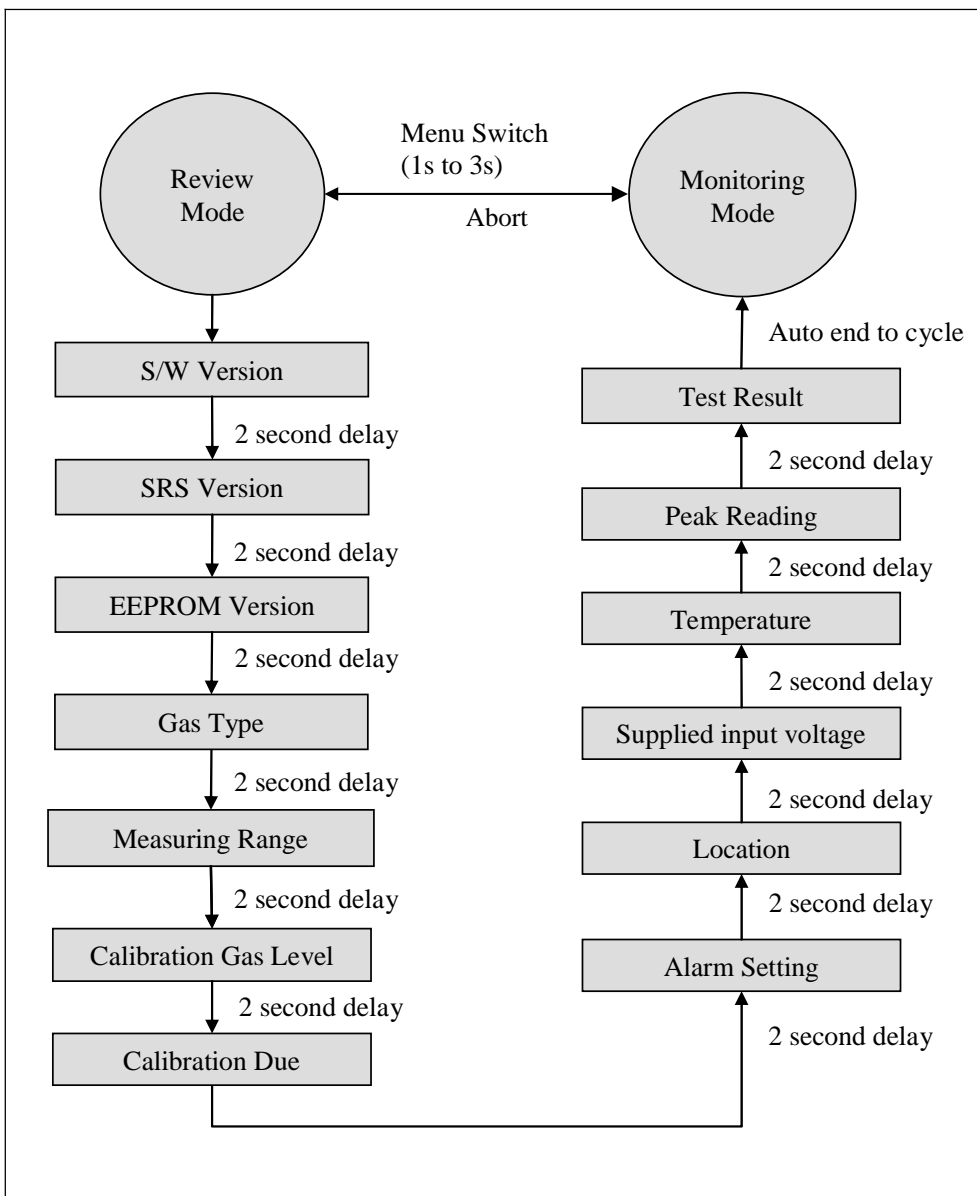
Diagram 17: Review Mode

14 General specification

Sensepoint XCD Transmitter.	
Use	3-wire, 4-20mA, gas detector transmitter for use with directly installed flammable and toxic gas sensors. For the protection of personnel and plant from flammable and toxic gas hazards.
Electrical	
	Input Voltage Range: 16 to 32Vdc (24Vdc nominal) for ATEX/IECEx/AP Versions 12 to 32Vdc (24Vdc nominal) for UL/CSA version Max Power Consumption: Max 5 Watts. at 24Vdc (see section 2 regarding maximum in rush current) Current output 4-20mA (Source or Sink) ≥0.0<1.0 mA Fault (refer to table 5 section 12.3 for further details). 4.0 mA to 20.0 mA Normal gas measurement 2.0 mA or 4.0 mA (17.4 mA) Inhibit (during configuration/user settings) 22.0 mA Maximum over range Max load resistance 250 Ω Terminals 15 x screw terminals suitable for wire diameter 0.5mm^2 to 2.5mm^2 (20AWG to 13AWG). Relays 3 x 5A@250VAC. Selectable normally open or normally closed (switch) and energized/de-energized (programmable). Communication RS485, Modbus RTU
Construction	
Material	Epoxy painted aluminium alloy or 316 Stainless Steel
Weight	Aluminium alloy: 1.7kg, 316 Stainless Steel: 3.7kg
Mounting	Pole or wall mounting
Entries	2 x M20 (for ATEX/IECEx/AP Approval) or 2x3/4NPT (for UL Approval)
Certification	
China	GB Ex d IIC T4 GB3836.1&2 -2000, PA, (CCCF)
Korea	KTL Ex d IIC T6 (-40ºC to +65ºC)
US	UL - Class I, Division 1, Groups B, C and D, Class I, Division 2, Groups B, C & D, Class II, Division, Groups E, F & G, Class II, Division 2, Groups F & G. -40ºC to+65ºC
European	ATEX II 2 GD Ex d IIC Gb T6(Ta -40ºC to +65ºC) T5 (Ta -40ºC to +75ºC) Ex tb IIIC T85ºC Db IP66 T100ºC (Ta -40ºC to +75ºC)
International	IEC Ex II 2 GD Ex d IIC Gb T6(Ta -40ºC to +65ºC) T5 (Ta -40ºC to +75ºC) Ex tb IIIC T85ºC Db IP66 T100ºC (Ta -40ºC to +75ºC)
Performance	EN50271, EN60079-29-1 (Flammable), EN50104 (Oxygen), EN45544 (Toxic)
Marine	MED (O$_2$, FL-CAT, FL-IR), ABS (FL-CAT, FL-IR, H$_2$S), CCS (O$_2$, FL, Toxic), BV(H$_2$S)
CE	EN50270:2015 EN6100-6-4:2007
Environmental	
IP Rating	IP66 in accordance with EN60529:1992
Operating Temperature	-40ºC to +75ºC/ -40ºF to +167ºF Note: The detector display may become illegible at temperatures below -40°C, but the detector continues its gas monitoring function. The display is not damaged and recovers when the temperature rises back above -20 °C.
Operating Humidity	Continuous 20-90%RH (non condensing), Intermittent 10-99%RH (non condensing)
Operating Pressure	90-110kPa (EC Toxic Sensors), 80-120kPa (EC Oxygen, Catalytic Bead and Infrared Sensors)
Storage Conditions (detector and accessories)	-25°C to +65°C (-13°F to +149°F)

Detectable Gases & Performance (See notes below)

Gas	User Selectable Full Accuracy Scale Range	Default Range	Steps	User Selectable Cal Gas Range	Default Cal Point	Response Time (T90) secs	Recovery Time for Toxic Sensors (T10) secs	Accuracy	Operating Temperature*		Default alarm points		Lowest Alarm Level	Performance Approved
									Min	Max	A1	A2		
Electrochemical Sensors														
Oxygen	25.0%V/V only	25.0%V/V	n/a	20.9%V/V (Fixed)	20.9%V/V	<30[7]	40	<+/-0.5%V/V	-20°C / -4°F	55°C / 131°F	19.5%V/V▼	23.5%V/V▲	5%V/V	✔
Hydrogen Sulfide	10.0 to 100.0ppm	50.0ppm	1.0ppm	30 to 70% of selected full scale range	25.0ppm	<50	40	<+/-1ppm	-20°C / -4°F	55°C / 131°F	10.0ppm▲	20.0ppm▲	1.0ppm	✔
Carbon Monoxide	100 to 1,000ppm	300ppm	100ppm		100ppm	<30	40	<+/-6ppm	-20°C / -4°F	55°C / 131°F	100ppm▲	200ppm▲	15ppm	✔
Hydrogen	1,000ppm only	1,000ppm	n/a		500ppm	<65	110	<+/-25ppm	-20°C / -4°F	55°C / 131°F	200ppm▲	400ppm▲	100ppm	
Nitrogen Dioxide**	10.0 to 50.0 ppm	10.0 ppm	5.0 ppm		5.0 ppm	<40	75	+/-3ppm or +/-20%	-20°C / -4°F	55°C / 131°F	5ppm ▲	10ppm▲	0.6ppm	
Catalytic Bead Sensors				25 to 95 % of selected full scale range										
Flammable 1 to 8*	20 to 100%LEL	100%LEL	10%LEL		50%LEL	<25[8]	N/A	<+/-1.5%LEL	-20°C / -4°F	55°C / 131°F	20%LEL▲	40%LEL▲	10-40%LEL dependent on star rating	Methane, Ethane and Propane
Infrared Sensors														
Methane	20 to 100%LEL	100%LEL	10%LEL	30 to 70% of selected full scale range	50%LEL	<30	N/A	<+/-1.5%LEL	-20°C / -4°F	55°C / 131°F	20%LEL▲	40%LEL▲	10%LEL	
Propane	20 to 100%LEL	100%LEL	10%LEL		50%LEL	<30	N/A	<+/-1.5%LEL	-20°C / -4°F	55°C / 131°F	20%LEL▲	40%LEL▲	10%LEL	
Carbon Dioxide	2.00%V/V only	2.00%V/V	n/a		1.00%V/V	<30	100	<+/-0.04%V/V	-20°C / -4°F	55°C / 131°F	0.40%V/V▲	0.80%V/V▲	0.25%V/V	
Carbon Dioxide	5.00%V/V only	5.00%V/V	n/a		2.50%V/V	<60	<70	<+/-0.2%V/V	-20°C / -4°F	50°C / 122°F	0.40%V/V▲	0.80%V/V▲	0.25%V/V	

▲ - Rising Alarm ▼ - Falling Alarm

NOTES

Performance figures are taken at 20~25°C;

1. measured using a sample humidity of 50%RH, applicable between 10 and 90% of full scale,
2. measured using test units calibrated at 50% of full scale,
3. measured at 1000cc/min for Methane CAT, 500cc/min for O2, Toxic and Methane/Carbon Dioxide IR with calibration cup (S3KCAL).
4. Toxic and Oxygen sensor recovery times are taken at 20°C, 50%RH and 500cc/min with calibration cup (S3KCAL).
5. The maximum recommended alarm level for flammable sensors according to EN60079-29-1 is 60%LEL.
6. Please note that XCD oxygen transmitter is intended for the measurement of oxygen deficiency or enrichment and not for inertization measurements.
7. Response time (T90) under test conditions of EN 50104 ≤ 38 s
8. Response time (T90) under test conditions of EN 60079-29-1 for methane ≤ 55 s, for propane ≤ 60 s.

Response time (T90) may increase when operating in lower or higher temperature conditions or when gas is introduced with the Weather Protection accessory (SPXCDWP) fitted. Methane IR sensor is calibrated and linearised only for Methane. Should it be exposed to other HC then non linear response is expected. For linearised operation other than Methane contact HA for alternate parts. Flammable CAT and Methane IR is calibrated at the factory 50%LEL Methane (2.5%V/V). This calibration enables 100% functional test prior to dispatch. This calibration does not remove need for calibration & test as part of commissioning at site.

For gases other than Methane the unit has to be calibrated at site using target gas.Data represents typical values, and system conditioning may be required to achieve stated result. Contact HA for details.

* Extended operating temperature range of -40°C to +65°C (-40°F to +149°F) for all sensor except for IR and H2 EC sensors, with an accuracy of +/- 30% of applied gas from -20°C to -40°C (-4°F to -40°F) and +55°C to +65°C (+131°F to +149°F). For the Methane IR Sensors, the accuracy is +/-10% LEL from - 20°C to -40°C.
Long term operation at this range may cause decline in sensor performance.

** Care should be taken when setting alarm points lower than 3ppm especially in high humidity conditions (higher than 50%RH), since the gas reading could be lower than the actual concentration.
Contact Honeywell Analytics for any additional data or details.

15 Ordering information

Part number	Description
Sensepoint XCD transmitter and sensor KIT (ATEX/IECEx/AP*, LM25 and M20 Entry)	
SPXCDALMFX	ATEX/IECEx/AP* Methane CAT 0-100%LEL (20,0 to 100.0%LEL, 10%LEL) with LM25, M20 Entry
SPXCDALMRX	ATEX/IECEx/AP* Methane IR 0-100%LEL (20,0 to 100.0%LEL, 10%LEL) with LM25, M20 Entry
SPXCDALMPX	ATEX/IECEx/AP* Propane IR 0-100%LEL (20,0 to 100.0%LEL, 10%LEL) with LM25, M20 Entry
SPXCDALMO1	ATEX/IECEx/AP* Oxygen 25.0%/Vol with LM25, M20 Entry
SPXCDALMHX	ATEX/IECEx/AP* Hydrogen Sulfide 0-50ppm (10.0 to 100.0ppm, 1ppm) with LM25, M20 Entry
SPXCDALMCX	ATEX/IECEx/AP* Carbon Monoxide 0-500ppm (100 to 1000ppm, 100ppm) with LM25, M20 Entry
SPXCDALMG1	ATEX/IECEx/AP* Hydrogen 0-1000ppm with LM25, M20 Entry
SPXCDALNNX	ATEX/IECEx/AP* Nitrogen Dioxide 0-50ppm with Aluminium alloy, M20 Entry
SPXCDALMB1	ATEX/IECEx/AP* approved Carbon Dioxide IR 0-2.00%VOL with LM25, M20 Entry
SPXCDALMB2	ATEX/IECEx/AP* approved Carbon Dioxide IR 0-5.00%VOL with LM25, M20 Entry
Sensepoint XCD transmitter and sensor KIT (ATEX/IECEx/AP*, 316SS and M20 Entry)	
SPXCDASMFX	ATEX/IECEx/AP* approved Methane CAT 0-100%LEL (20 to 100%LEL, 10%LEL) with 316SS, M20 Entry
SPXCDASMRX	ATEX/IECEx/AP* approved Methane IR 0-100%LEL (20 to 100%LEL, 10%LEL) with 316SS, M20 Entry
SPXCDASMPX	ATEX/IECEx/AP* approved Propane IR 0-100%LEL (20 to 100%LEL, 10%LEL) with 316SS, M20 Entry
SPXCDASMO1	ATEX/IECEx/AP* approved Oxygen 25.0%/Vol with 316SS, M20 Entry
SPXCDASMHX	ATEX/IECEx/AP* approved Hydrogen Sulfide 0-50ppm (10.0 to 100.0ppm, 1ppm) with 316SS, M20 Entry
SPXCDASMCX	ATEX/IECEx/AP* approved Carbon Monoxide 0-300ppm (100 to 1000ppm, 100ppm) with 316SS, M20 Entry
SPXCDASMG1	ATEX/IECEx/AP* approved Hydrogen 0-1000ppm with 316SS, M20 Entry
SPXCDASNNX	ATEX/IECEX/ AP* approved Nitrogen Dioxide 0-50ppm with SS316, M20 Entry
SPXCDASMB1	ATEX/IECEx/AP* approved Carbon Dioxide IR 0-2.00%VOL with 316SS, M20 Entry
SPXCDASMB2	ATEX/IECEx/AP* approved Carbon Dioxide IR 0-5.00%VOL with 316SS, M20 Entry
Sensepoint XCD transmitter and sensor KIT (UL, LM25 and 3/4"NPT Entry)	
SPXCDULNFX	UL/cUL approved Methane CAT 0-100%LEL (20 to 100%LEL, 10%LEL) with LM25, 3/4"NPT Entry
SPXCDULNRX	UL/cUL approved Methane IR 0-100%LEL (20 to 100%LEL, 10%LEL) with LM25, 3/4"NPT Entry
SPXCDULNPX	UL/cUL approved Propane IR 0-100%LEL (20 to 100%LEL, 10%LEL) with LM25, 3/4"NPT Entry
SPXCDULNO1	UL/cUL approved Oxygen 25.0%/Vol with LM25, 3/4"NPT Entry
SPXCDULNHX	UL/cUL approved Hydrogen Sulfide 0-50ppm (10.0 to 100.0ppm, 1ppm) with LM25, 3/4"NPT Entry
SPXCDULNCX	UL/cUL approved Carbon Monoxide 0-300ppm (100 to 1000ppm, 100ppm) with LM25, 3/4"NPT Entry
SPXCDULNG1	UL/cUL approved Hydrogen 0-1000ppm with LM25, 3/4"NPT Entry
SPXCDULNNX	UL approved SP XCD Nitrogen Dioxide 0-50ppm with LM25, 3/4"NPT Entry
SPXCDULNB1	UL/cUL approved Carbon Dioxide IR 0-2.00%VOL with LM25, 3/4"NPT Entry
SPXCDULNB2	UL/cUL approved Carbon Dioxide IR 0-5.00%VOL with LM25, 3/4"NPT Entry
Sensepoint XCD transmitter and sensor KIT (UL, 316SS and 3/4"NPT Entry)	
SPXCDUSNFX	UL/cUL approved Methane CAT 0-100%LEL (20 to 100%LEL, 10%LEL) with 316SS, 3/4"NPT Entry
SPXCDUSNRX	UL/cUL approved Methane IR 0-100%LEL (20 to 100%LEL, 10%LEL) with 316SS, 3/4"NPT Entry
SPXCDUSNPX	UL/cUL approved Propane IR 0-100%LEL (20 to 100%LEL, 10%LEL) with 316SS, 3/4"NPT Entry
SPXCDUSNO1	UL/cUL approved Oxygen 25.0%/Vol with 316SS, 3/4"NPT Entry
SPXCDUSNHX	UL/cUL approved Hydrogen Sulfide 0-50ppm (10.0 to 100.0ppm, 1ppm) with 316SS, 3/4"NPT Entry
SPXCDUSNCX	UL/cUL approved Carbon Monoxide 0-300ppm (100 to 1000ppm, 100ppm) with 316SS, 3/4"NPT Entry
SPXCDUSNG1	UL/cUL approved Hydrogen 0-1000ppm with 316SS, 3/4"NPT Entry
SPXCDUSNNX	UL approved SP XCD Nitrogen Dioxide 0-50ppm with SS316, 3/4"NPT Entry
SPXCDUSNB1	UL/cUL approved Carbon Dioxide IR 0-2.00%VOL with 316SS, 3/4"NPT Entry
SPXCDUSNB2	UL/cUL approved Carbon Dioxide IR 0-5.00%VOL with 316SS, 3/4"NPT Entry
Sensepoint XCD transmitter and sensor KIT (ATEX/IECEx/AP*, LM25 and M20 Entry with ModBus)	
SPXCDALMFXM	ATEX/IECEx/AP* Methane CAT 0-100%LEL (20,0 to 100.0%LEL, 10%LEL) with LM25, M20 Entry, with ModBus
SPXCDALMRXM	ATEX/IECEx/AP* Methane IR 0-100%LEL (20,0 to 100.0%LEL, 10%LEL) with LM25, M20 Entry, with ModBus
SPXCDALMPXM	ATEX/IECEx/AP* Propane IR 0-100%LEL (20,0 to 100.0%LEL, 10%LEL) with LM25, M20 Entry, with ModBus
SPXCDALMO1M	ATEX/IECEx/AP* Oxygen 25.0%/Vol with LM25, M20 Entry, with ModBus
SPXCDALMHXM	ATEX/IECEx/AP* Hydrogen Sulfide 0-50ppm (10.0 to 100.0ppm, 1ppm) with LM25, M20 Entry, with ModBus
SPXCDALMCXM	ATEX/IECEx/AP* Carbon Monoxide 0-500ppm (100 to 1000ppm, 100ppm) with LM25, M20 Entry, with ModBus
SPXCDALMG1M	ATEX/IECEx/AP* Hydrogen 0-1000ppm with LM25, M20 Entry, with ModBus
SPXCDALNNXM	ATEX/IECEX /AP approved Nitrogen Dioxide 0-50ppm with LM25, M20 Entry, With Modbus
SPXCDALMB1M	ATEX/IECEx/AP* approved Carbon Dioxide IR 0-2.00%VOL with LM25, M20 Entry, with ModBus
SPXCDALMB2M	ATEX/IECEx/AP* approved Carbon Dioxide IR 0-5.00%VOL with LM25, M20 Entry, with ModBus
Sensepoint XCD transmitter and sensor KIT (ATEX/IECEx/AP*, 316SS and M20 Entry with ModBus)	
SPXCDASMFXM	ATEX/IECEx/AP* approved Methane CAT 0-100%LEL (20 to 100%LEL, 10%LEL) with 316SS, M20 Entry, with ModBus
SPXCDASMRXM	ATEX/IECEx/AP* approved Methane IR 0-100%LEL (20 to 100%LEL, 10%LEL) with 316SS, M20 Entry, with ModBus
SPXCDASMPXM	ATEX/IECEx/AP* approved Propane IR 0-100%LEL (20 to 100%LEL, 10%LEL) with 316SS, M20 Entry, with ModBus
SPXCDASMO1M	ATEX/IECEx/AP* approved Oxygen 25.0%/Vol with 316SS, M20 Entry, with ModBus
SPXCDASMHXM	ATEX/IECEx/AP* approved Hydrogen Sulfide 0-50ppm (10.0 to 100.0ppm, 1ppm) with 316SS, M20 Entry, with ModBus
SPXCDASMCXM	ATEX/IECEx/AP* approved Carbon Monoxide 0-300ppm (100 to 1000ppm, 100ppm) with 316SS, M20 Entry, with ModBus
SPXCDASMG1M	ATEX/IECEx/AP* approved Hydrogen 0-1000ppm with 316SS, M20 Entry, with ModBus
SPXCDASNNXM	ATEX/IECEX /AP approved Nitrogen Dioxide 0-50ppm with SS316, M20 Entry, With Modbus
SPXCDASMB1M	ATEX/IECEx/AP* approved Carbon Dioxide IR 0-2.00%VOL with 316SS, M20 Entry, with ModBus
SPXCDASMB2M	ATEX/IECEx/AP* approved Carbon Dioxide IR 0-5.00%VOL with 316SS, M20 Entry, with ModBus
UL APPROVAL (Epoxy Coated Aluminium Alloy, LM25, With Modbus)	
SPXCDULNFXM	UL/cUL approved Flammable CAT 0-100%LEL (20,0 to 100.0%LEL, 10%LEL) with LM25, 3/4"NPT Entry, with Modbus
SPXCDULNRXM	UL/cUL approved Methane IR 0-100%LEL (20,0 to 100.0%LEL, 10%LEL) with LM25, 3/4"NPT Entry, with Modbus
SPXCDULNPXM	UL/cUL approved Propane IR 0-100%LEL (20,0 to 100.0%LEL, 10%LEL) with LM25, 3/4"NPT Entry, with Modbus
SPXCDULNO1M	UL/cUL approved Oxygen 25.0%/Vol with LM25, 3/4"NPT Entry, with Modbus
SPXCDULNHXM	UL/cUL approved Hydrogen Sulfide 0-50ppm (10.0 to 100.0ppm, 1ppm) with LM25, 3/4"NPT Entry, with Modbus

SPXCDULNCXM	UL/cUL approved Carbon Monoxide 0-500ppm (100 to 1000ppm, 100ppm) with LM25, 3/4"NPT Entry, with Modbus
SPXCDULNG1M	UL/cUL approved Hydrogen 0-1000ppm with LM25, 3/4"NPT Entry, with Modbus
SPXCDULNNXM	UL/cUL approved Nitrogen Dioxide 0-50ppm with LM25, 3/4"NPT Entry, with Modbus
SPXCDULNB1M	UL/cUL approved Carbon Dioxide IR 0-2%VOL with LM25, 3/4"NPT Entry, with Modbus
SPXCDULNB2M	UL/cUL approved Carbon Dioxide IR 0-5%VOL with LM25, 3/4"NPT Entry, with Modbus
UL APPROVAL (Epoxy Coated Stainless Steel, SS316, With Modbus)	
SPXCDUSNFXM	UL/cUL approved Flammable CAT 0-100%LEL (20,0 to 100.0%LEL, 10%LEL) with SS316, 3/4"NPT Entry, with Modbus
SPXCDUSNRXM	UL/cUL approved Methane IR 0-100%LEL (20,0 to 100.0%LEL, 10%LEL) with SS316, 3/4"NPT Entry, with Modbus
SPXCDUSNPXM	UL/cUL approved Propane IR 0-100%LEL (20,0 to 100.0%LEL, 10%LEL) with SS316, 3/4"NPT Entry, with Modbus
SPXCDUSNO1M	UL/cUL approved Oxygen 25.0%/Vol with SS316, 3/4"NPT Entry, with Modbus
SPXCDUSNHXM	UL/cUL approved Hydrogen Sulfide 0-50ppm (10.0 to 100.0ppm, 1ppm) with SS316, 3/4"NPT Entry, with Modbus
SPXCDUSNCXM	UL/cUL approved Carbon Monoxide 0-500ppm (100 to 1000ppm, 100ppm) with SS316, 3/4"NPT Entry, with Modbus
SPXCDUSNG1M	UL/cUL approved Hydrogen 0-1000ppm with SS316, 3/4"NPT Entry, with Modbus
SPXCDUSNNXM	UL/cUL approved Nitrogen Dioxide 0-50ppm with SS316, 3/4"NPT Entry, with Modbus
SPXCDUSNB1M	UL/cUL approved Carbon Dioxide IR 0-2%VOL with SS316, 3/4"NPT Entry, with Modbus
SPXCDUSNB2M	UL/cUL approved Carbon Dioxide IR 0-5%VOL with SS316, 3/4"NPT Entry, with Modbus
Replacement sensor Cartridge	
SPXCDXSFXSS	Methane CAT 0-100%LEL (20,0 to 100.0%LEL, 10%LEL)
SPXCDXSRXSS	Methane IR 0-100%LEL (20,0 to 100.0%LEL, 10%LEL)
SPXCDXSPXSS	Propane IR 0-100%LEL (20,0 to 100.0%LEL, 10%LEL)
SPXCDXSO1SS	Oxygen 25.0%/Vol only
SPXCDXSHXSS	Hydrogen Sulfide 0-50ppm (10.0 to 100.0ppm, 1ppm)
SPXCDXSCXSS	Carbon Monoxide 0-500ppm (100 to 1000ppm, 100ppm)
SPXCDXSG1SS	Hydrogen 0-1000ppm only
SPXCDXSNXSS	Nitrogen Dioxide 0-10ppm (10.0 to 50.0ppm)
SPXCDXSB1SS	Carbon Dioxide IR 0-2.00%VOL only
SPXCDXSB2SS	Carbon Dioxide IR 0-5.00%VOL only
Accessories	
S3KCAL	Calibration cap
SPXCDCC	Collecting cone for use with lighter than air gases
SPXCDDMK	Duct mounting kit
SPXCDHMANEN	Hard Copy Manual in English
SPXCDMTBR	Pipe Mounting bracket (inc. fixings and hex wrench set)
SPXCDSDP	Sunshade / Deluge Protection
SPXCDHMANEN	Hard Copy Manual in English
SPXCDHMANCN	Hard Copy Manual in Chinese
SPXCDHMANKR	Hard Copy Manual in Korean
Spares	
SPXCDDMT	Replacement display module (O2 & Toxic) for 16-32 Vdc
SPXCDDMF	Replacement display module (FL & IR) for 16-32 Vdc
SPXCDTMO	Replacement terminal module (O2) for 16-32 Vdc
SPXCDTMT	Replacement terminal module (Toxic) for 16-32 Vdc
SPXCDTMF	Replacement terminal module (FL & IR) for 16-32 Vdc
SPXCDDMT12	Replacement display module (O2 & Toxic) for 12-32 Vdc
SPXCDDMF12	Replacement display module (FL & IR) for 12-32 Vdc
SPXCDTMO12	Replacement terminal module (O2) for 12-32 Vdc
SPXCDTMT12	Replacement terminal module (Toxic) for 12-32 Vdc
SPXCDTMF12	Replacement terminal module (FL & IR) for 12-32 Vdc
SPXCDMBUS	Replacement Modbus Module
SPXCDNPTP	3/4"NPT Plug
SPXCDM20P	M20 Plug
SPXCDMANCD	Instruction manual CD
SPXCDNADP	3/4"NPT to M20 Adaptor
SPXCDWP	Weather Protection
SPXCDMAG	Magnet
SPXCDSRLS	Sensor Retainer with locking screw
SPXCDAKS	Allen key for stopper
SPXCDHWES	Hex wrench for earth screw
SPXCDEBS	Earth Bracket and Screws
Special Flammable Gas Calibration	
SPXCDSFGC1	Special Flammable Gas Calibration, 0-100%LEL, 1*
SPXCDSFGC2	Special Flammable Gas Calibration, 0-100%LEL, 2*
SPXCDSFGC3	Special Flammable Gas Calibration, 0-100%LEL, 3*
SPXCDSFGC4	Special Flammable Gas Calibration, 0-100%LEL, 4*
SPXCDSFGC5	Special Flammable Gas Calibration, 0-100%LEL, 5*
SPXCDSFGC7	Special Flammable Gas Calibration, 0-100%LEL, 7*
SPXCDSFGC8	Special Flammable Gas Calibration, 0-100%LEL, 8*
Note: If no Special Flammable Gas Calibration part no. is included on PO, a Methane (6* calibration will be supplied)	

* AP approvals include GB & PA for China and KTL for Korea.

16 Warranty statement

All products are designed and manufactured to the latest internationally recognized standards by Honeywell Analytics under a Quality Management system that is certified to ISO 9001. As such Honeywell Analytics warrants its products against defective parts and workmanship and will repair or (at its option) replace any instruments which are or may become defective under proper use within 12 months from date of commissioning by an approved Honeywell Analytics representative
or 18 months from date of shipment from Honeywell Analytics, whichever is the sooner. This warranty does not cover disposable batteries or damage caused by accident, abuse, abnormal operating conditions or poisoning of sensor.

Defective goods must be returned to Honeywell Analytics premises accompanied by a detailed description of any issue. Where return of goods is not practicable Honeywell Analytics reserves the right to charge for any site attendance where any fault is not found with he the equipment. Honeywell Analytics shall not be liable for any loss or damage whatsoever or howsoever occasioned which may be a direct or indirect result of the use or operation of the Contract Goods by the Buyer or any Party.

This warranty covers instrument and parts sold to the Buyer only by authorized distributors, dealers and representatives as appointed by Honeywell Analytics. The warranties set out in this clause are not pro rata, i.e. the initial warranty period is not extended by virtue of any works carried out there under.

In no event will Honeywell Analytics be liable for any incidental damages, consequential damages, special damages, punitive damages, statutory damages, indirect damages, loss of profits, loss of revenues, or loss of use, even if informed of the possibility of such damages. Honeywell Analytic's liability for any claims arising out of or related to this product will in no case exceed the order value. To the extent permitted by applicable law, these limitations and exclusions will apply regardless of whether liability arises from breach of contract, warranty, tort (including but not limited to negligence), by operation of law, or otherwise.

17 Installation Drawing

17.1 Mechanical Installation Drawing

17.2 Electronic Connection Drawing
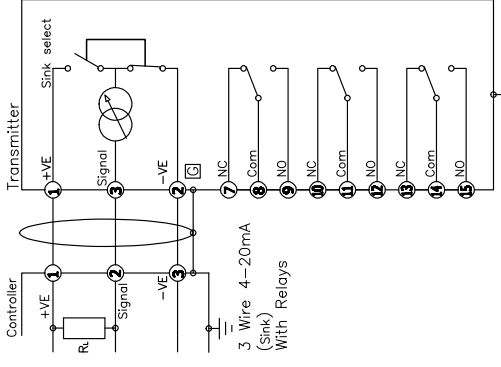
Honeywell

TRANSMITTER CONNECTIONS

Terminal	No.	Function
Power	1	+24V DC
Power	2	0V
Power	3	4~20 mA (signal)
Digital comm	4	Common
Digital comm	5	D1("B" / "+")
Digital comm	6	D0("A" / "-")
Relay	7	RLY1 NC
Relay	8	RLY1 COM
Relay	9	RLY1 NO
Relay	10	RLY2 NC
Relay	11	RLY2 COM
Relay	12	RLY2 NO
Relay	13	RLY3 NC
Relay	14	RLY3 COM
Relay	15	RLY3 NO

THIS ITEM FORMS PART OF A CERTIFIED PRODUCT
NO MODIFICATION PERMITTED WITHOUT
REFERENCE TO CERTIFICATION DEPARTMENT

TITLE: **Sensepoint XCD Installation Drawing**

DR'N BEN   6/25/2008

3001G0471

SCALE NTS   SHT. 2 OF 3
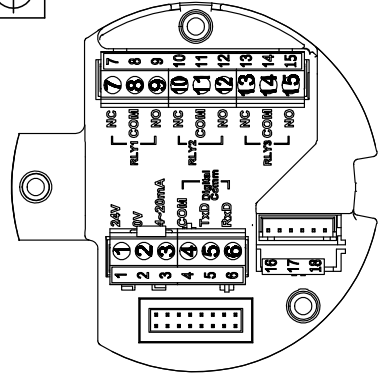
3 Wire 4~20mA (Source) with Relays

3 Wire 4~20mA (Sink) with Relays

NOTES:
1. REFER TO INSTRUCTION MANUAL FOR TECHNICAL DETAILS.
2. XCD OPERATING VOLTAGE 12~32Volts DC, 3W(Max) FOR UL VERSION.
   16~32Volts DC, 5W(Max) FOR ATEX VERSION.
3. 4~20 mA LOOP RESISTANCE TO BE <250 ohms
4. POWER SUPPLY LOOP RESISTANCE TO BE <26 ohm
5. NO TWO 'EARTH POINTS' SHOULD BE CONNECTED VIA SCREEN AND/OR CONDUIT SO AS TO AVOID 'GROUND LOOPS'.
6. MULTIPLE 'EARTH POINTS' ARE NOT ALLOWED.
7. 'G POINTS' (CONTINUITY OF SCREEN) MAY BE ACHIEVED USING APPROPRIATE GLANDS/CABLE OR CONDUIT; INTERNAL AND EXTERNAL 'EARTH POINTS' IN THE TRANSMITTER ARE PROVIDED.
8. XCD TRANSMITTER CERTIFICATION
   KTL : Ex d IIC T6 (Tamb. -40°C to 65°C)

THIS DRAWING IS CONFIDENTIAL. IT IS THE PROPERTY OF HONEYWELL ANALYTICS LTD AND MUST NOT BE REPRODUCED EITHER WHOLLY OR PARTLY. ALL RIGHTS IN RESPECT OF PATENTS, DESIGNS AND COPYRIGHT ARE RESERVED.

THIS DOCUMENT HAS BEEN GENERATED USING AutoCAD AND MUST ONLY BE UPDATED BY C.A.D.

ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED. AND APPLY AFTER PLATING
THIS DRAWING IS TO BS 8888
REMOVE ALL BURRS AND SHARP EDGES
SURFACE TEXTURE VALUES ARE IN um Ra AND TO BS 1134

17.3 Duct Mounting Drawing

17.4 Collecting Cone Drawing

17.5 Mounting Bolt Assy Drawing
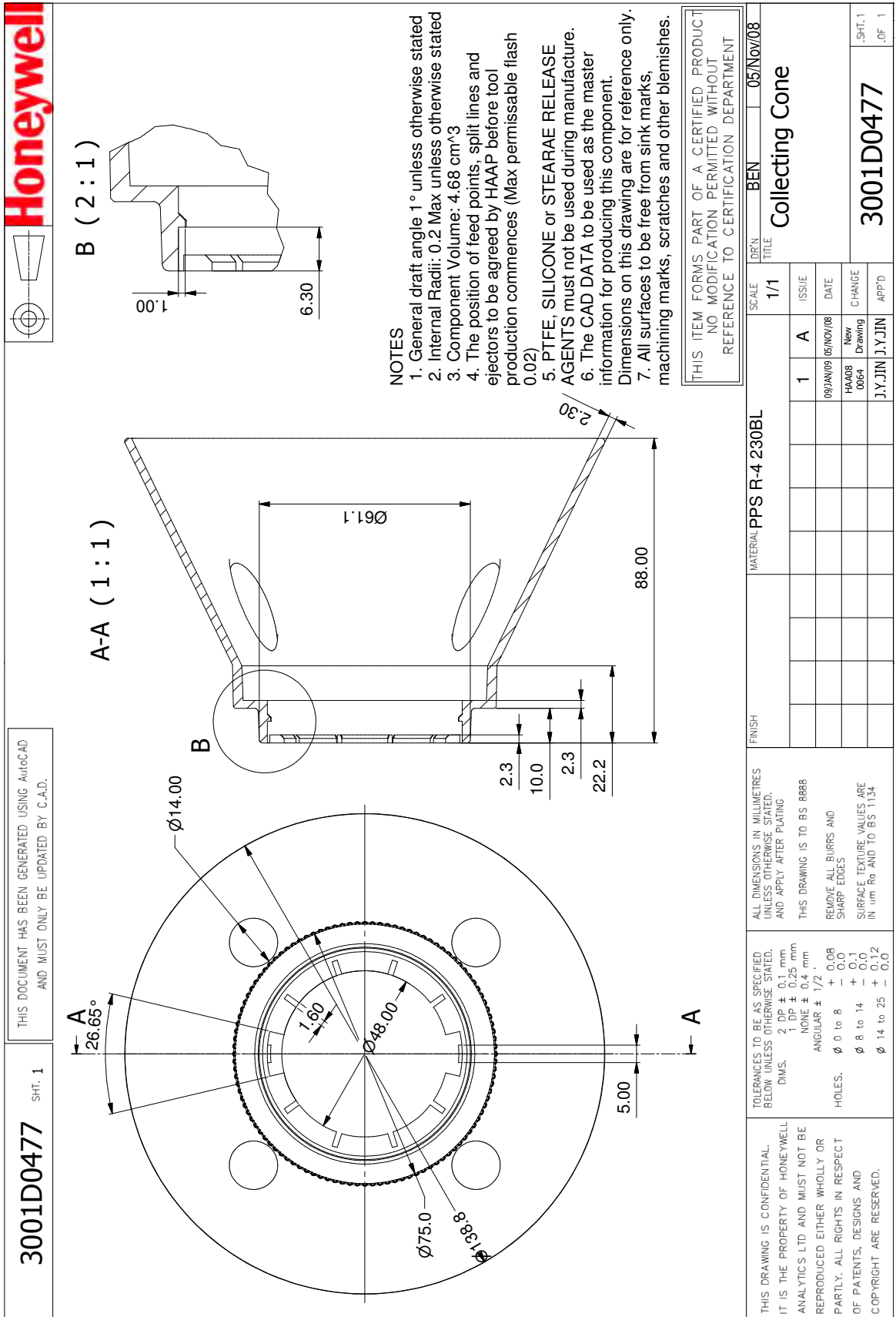
17.6 Mounting Bracket Drawing
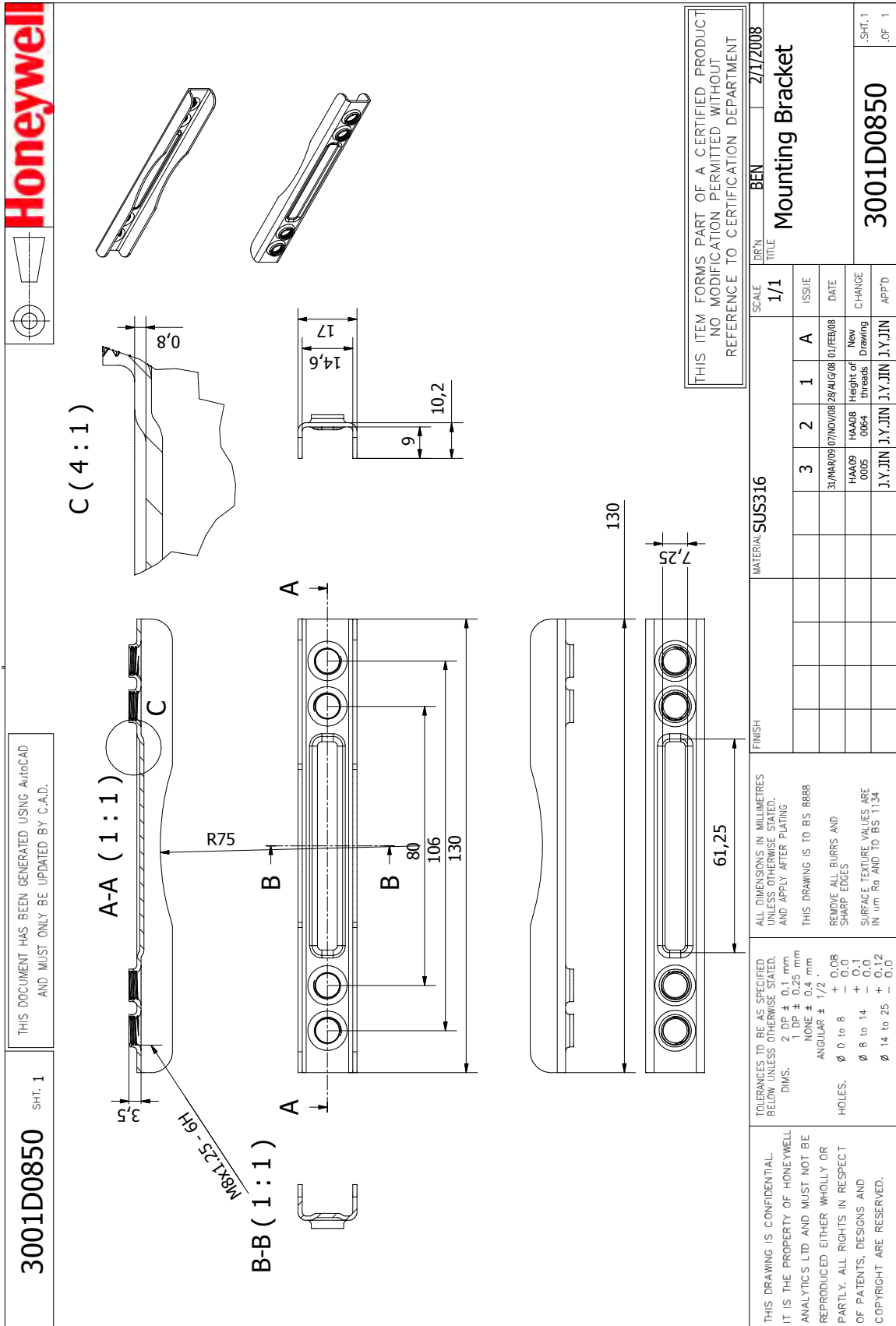
18 Certification

18.1 China GB Ex and PA

China GB Ex (Chinese Version):

China GB Ex (English Version):

EXPLOSION PROTECTION
CERTIFICATE OF CONFORMITY

Cert No. GYJ081072X

This is to certify that the product

Gas Detector

manufactured by   Honeywell Analytics AP
(Address: 508 Kolon Science Valley(I) 187-10 Guro-dong,
Guro-Gu Seoul, 152-050, Korea)

which model is   Sensepoint XCD

Ex marking   Ex d II CT4

product standard

drawing number   3001EG026, 3001EG027

has been inspected and certified by NEPSI, and that it conforms

to   GB3836.1-2000   GB3836.2-2000

This Approval shall remain in force until   2013.07.24

Remarks   Special conditions for safe use specified in the attachment 1 to this certificate.

Director

National Supervision and Inspection Centre for
Explosion Protection and Safety of Instrumentation
Issued Date 2008.07.25

This Certificate is valid for products compatible with the documents and samples approved by NEPSI.

103 Cao Bao Road   http://www.nepsi.org.cn   Tel:0086 21 64368180
Shanghai 200233, China   Email: info@nepsi.org.cn   Fax:0086 21 64844580

China PA Certification:

中 华 人 民 共 和 国

计 量 器 具 型 式 批 准 证 书

PATTERN APPROVAL CERTIFICATE OF THE MEASURING INSTRUMENTS OF THE PEOPLE'S REPUBLIC OF CHINA

韩国 Honeywell Analytics AP

根据《中华人民共和国计量法》及相关规定和技术要求，下列计量器具经定型鉴定合格，现予批准。

According to the Law on Metrology of the People's Republic of China and the relevant regulations, the pattern of measuring instruments applied for pattern approval have been approved.

计量器具名称及型号：

Name and type of the measuring instruments:

气体检测仪（Sensepoint XCD 型）

规格:CO（0~500）μL/L   CH₄（0~100）%LEL

注：本次评价试验仅包含 CO，CH₄ 两种气体

计量器具的技术指标见型式注册表。

The technical specifications of the measuring instruments are described in the pattern registration list.

型式批准的标志与编号：

The mark and identification numbers of the pattern approval:

批准时的附件：
1. 计量器具型式评价报告
2. 型式注册表
3. 型式评价大纲

(PA)
2008-C285

批准人
Approval signature

批准部门
Approval authority

批准日期 二〇〇八年十月八日
Approval date

18.2 Korea KTL

제2013-019938-02호   ktl 한국산업기술시험원

안전인증면제확인서

	사업장명		사업장관리번호	
		한국하니웰(주) 천안공장		312-85-08708-0
신청인	사업자등록번호		대표자 성명	
		312-85-08708		홍 순 호
	소재지			
		충청남도 천안시 서북구2공단2로 28 (성상동)		

면제 확인번호	
	13-KB2BO-0407-ex
인증번호	
	IECEx BAS 08.0072 (Issue No. 5)
안전인증대상 기계·기구명	
	설치용 가스탐지기

형식(규격)	용량(등급)
Sensepoint XCD Transmitter	Ex d IIC T6/T4

	면제 항목	
		형식별 제품심사
면제내용	면제 사유 (관련 법령 등)	
		산업안전보건법 시행규칙 제58조의2(안전인증의 면제)
	안전인증면제 유효기간	
		-

「산업안전보건법」 제34조 및 같은 법 시행규칙 제58조의2제4항에 따라 안전인증 면제확
인서를 발급합니다.

2013 년   7 월   18 일

한국산업기술시험원장

18.3 European ATEX

ATEX For Transmitter:

Certificate Number Baseefa08ATEX0222	**Baseefa**	Issued 31 October 2008 Page 1 of 2

1   **EC - TYPE EXAMINATION CERTIFICATE**

2   Equipment or Protective System Intended for use in Potentially Explosive Atmospheres
     Directive 94/9/EC

3   EC - Type Examination   Baseefa08ATEX0222
     Certificate Number:

4   Equipment or Protective System: A Type XCD Transmitter

5   Manufacturer: **Honeywell Analytics**

6   Address: 405 Barclay Boulevard, Lincolnshire, IL 60069, USA.

7   This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8   Baseefa, Notified Body number 1180, in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential Report No. GB/BAS/ExTR08.0149/00

9   Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

      IEC60079-0: 2007   EN60079-1: 2007   EN 61241-1: 2006

except in respect of those requirements listed at item 18 of the Schedule.

10   If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

11   This EC - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified equipment or protective system. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12   The marking of the equipment or protective system shall include the following :

     (Ex) II GD   Ex d IIC Gb T6 (Ta -40°C to +65°C)   Ex tb IIIC T85°C Db IP66

This certificate may only be reproduced in its entirety, without any change, schedule included.

Baseefa Customer Reference No. 5989   Project File No. 08/0201

This certificate is granted subject to the general terms and conditions of Baseefa. It does not necessarily indicate that the equipment may be used in particular industries or circumstances.

Baseefa
Rockhead Business Park, Staden Lane,
Buxton, Derbyshire SK17 9RZ
Telephone +44 (0) 1298 766600   Fax +44 (0) 1298 766601
e-mail info@baseefa.com   web site www.baseefa.com
Baseefa is a trading name of Baseefa Ltd
Registered in England No. 4305578   Registered address as above.

pp D BREARLEY
R S SINCLAIR
DIRECTOR
On behalf of
Baseefa

ATEX for Sensor

Certificate Number
Baseefa08ATEX0316X

Baseefa

Issued 9 March 2009
Page 1 of 2

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1.   ## EC - TYPE EXAMINATION CERTIFICATE

2.   Equipment or Protective System Intended for use in Potentially Explosive Atmospheres
      Directive 94/9/EC

3.   EC - Type Examination   Baseefa08ATEX0316X
      Certificate Number:

4.   Equipment or Protective System: A Type XCD Gas Sensor Head

5.   Manufacturer: Honeywell Analytics Inc.

6.   Address: 405 Barclay Boulevard, Lincolnshire, IL 60069, USA.

7.   This equipment or protective system and any acceptable variation thereto is specified in the schedule to this
      certificate and the documents therein referred to.

8.   Baseefa, Notified Body number 1180, in accordance with Article 9 of the Council Directive 94/9/EC of 23 March
      1994, certifies that this equipment or protective system has been found to comply with the Essential Health and
      Safety Requirements relating to the design and construction of equipment and protective systems intended for use in
      potentially explosive atmospheres given in Annex II to the Directive.

      The examination and test results are recorded in confidential Report No. GB/BAS/ExTR08.0220/00

9.   Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

      IEC 60079-0: 2007   EN 60079-1: 2007   EN 61241-1: 2004

      except in respect of those requirements listed at item 18 of the Schedule.

10.   If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject
      to special conditions for safe use specified in the schedule to this certificate.

11.   This EC - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified
      equipment or protective system. Further requirements of the Directive apply to the manufacturing process and
      supply of this equipment or protective system. These are not covered by this certificate.

12.   The marking of the equipment or protective system shall include the following :

      ⟨Ex⟩ II 2 GD   Ex d IIC T6 (Ta –40°C to +65°C) Gb   Ex tb IIIC T85°C Db IP6X A21

      This certificate may only be reproduced in its entirety, without any change, schedule included.

Baseefa Customer Reference No. 5989   Project File No. 08/0261

This certificate is granted subject to the general terms and conditions of
Baseefa. It does not necessarily indicate that the equipment may be
used in particular industries or circumstances.

Baseefa
Rockhead Business Park, Staden Lane,
Buxton, Derbyshire SK17 9RZ
Telephone +44 (0) 1298 766600   Fax +44 (0) 1298 766601
e-mail info@baseefa.com   web site www.baseefa.com
Baseefa is a trading name of Baseefa Ltd
Registered in England No. 4305578. Registered address as above

R S SINCLAIR
DIRECTOR
On behalf of
Baseefa

ATEX Special Conditions for Safe Use

Sensor:
The integral supply cable is to be protected from impact and be suitably terminated.

The attachment thread has a 3mm wide undercut. This shall be taken into consideration if the sensor is attached to a flameproof enclosure in order to maintain the minimum engaged thread length.

Equipotential bonding shall be provided by the mounting arrangements.

The sensor cartridge to housing joint maximum gap is 0.035mm which is less than that permitted. This joint shall not be enlarged in service.

When fitted with the supplied weather guard, the sensor head must be mounted so that the sinter is pointing downward to provide ingress protection IPX6

The weather guard is a potential electostatic charging hazard. The manufacturer's instructions should be observed

18.4 International IEC

IEC Ex for Transmitter

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No :	IECEx BAS 08.0072	Issue No.:0	Certificate history:
Status:	Current		
Date of Issue:	2008-11-10	Page 1 of 3	
Applicant:	Honeywell Analytics 405 Barclay Boulevard Lincolnshire Ilimois 60069 United States of America		
Electrical Apparatus: Optional accessory:	A Type XCD Transmitter		
Type of Protection:	Flameproof		
Marking:	Ex d IIC Gb T6 (Ta -40°C to +65°C) Ex tb IIIC T85°C Db IP66		

Approved for issue on behalf of the IECEx
Certification Body: R S Sinclair

Position: Managing Director

Signature:
(for printed version)

Date: 10/11/08

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:
Baseefa
Rockhead Business Park
Staden Lane
Buxton
Derbyshire
SK17 9RZ
United Kingdom

IEC Ex for Sensor

IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification Scheme for Explosive Atmospheres
for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.:	IECEx BAS 08.0104X	issue No.:0	Certificate history:
Status.	Current		
Date of Issue:	2009-03-09	Page 1 of 3	
Applicant.	Honeywell Analytics 405 Barclay Boulevard Lincolnshire Illinois 60069 United States of America		
Electrical Apparatus: Optional accessory:	A Type XCD Gas Sensor Head		
Type of Protection	Flameproof and Dust		
Marking:	Ex d IIC T6 (Ta -40°C to +65°C) Gb Ex tb IIIC T85°C Db IP6X A21		

Approved for issue on behalf of the IECEx   R S Sinclair
Certification Body:

Position: Managing Director

Signature:
(for printed version)

Date: 10-3-09

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the Official IECEx Website.

Certificate issued by:
Baseefa
Rockhead Business Park
Staden Lane
Buxton
Derbyshire
SK17 9RZ
United Kingdom

Baseefa

18.5 Sensepoint XCD ATEX Name Plate

THIS DOCUMENT HAS BEEN GENERATED USING ADOBE ILLUSTRATOR AND MUST ONLY BE UPDATED BY A.I.

Honeywell Sensepoint XCD
Honeywell Analytics Inc. Lincolnshire, IL, USA 60069
Read Sensepoint XCD Manual prior to use and install as per
Installation Drawing No.3001GXA71. Temp. Code T4 32Volts
DC MAX. Class 2, Pmax=5.5W
P/N :
S/N :

II 2 GD
Ex d IIC Db T6 (Ta -40℃ to +65℃)
Ex d IIC Db T5 (Ta -40℃ to +75℃)
IP66   T100℃ (Ta -40℃ to +75℃)
Baseefa06ATEX0222
IECEx BAS 08.0072

GB II 5/0.5/0087
Tx+40℃ to +65 ℃
1SK8280-0407
Ex d IIC T6/T5 Gb
Ex tb IIC T85℃ T100℃ Db IP66

CE 0044

WARNING : DO NOT OPEN WHEN ENERGISED OR
WHEN AN EXPLOSIVE ATMOSPHERE IS PRESENT
7F SangAm IT Tower, 434 Worldcup Buk-ro,
Mapo-gu, Seoul 03922, Korea   Made in Korea

NOTES
1. This is an ATEX schedule drawing and can only be changed after approval is given by the certifying body

2. Product name format:
Honeywell Sensepoint XCD XXX
XXX
  ┌── Blank - Sensepoint XCD for use with Sensepoint XCD socket and sensor.
  ├── RTD - Sensepoint XCD RTD for use with mA input sensors such as Sensepoint Toxic.
  └── RFD - Sensepoint XCD RFD for use with mV input sensors such as Sensepoint Flammable

3. Serial no. format
S/N: SIIPPPYYWWNNN
              │ └── Sequence number
              ├── Week of MFG
              ├── Year of MFG
              ├── Part Code
              ├── Issue State
              └── SUPPLIER CODE

4. Etching Depth : 0.1 mm

THIS ITEM FORMS PART OF A CERTIFIED PRODUCT
NO MODIFICATION PERMITTED WITHOUT
REFERENCE TO CERTIFICATION DEPARTMENT

		DRAWING	BEN HUR	16 /MAY/ 08
SCALE	NONE	TITLE		

Sensepoint XCD
ATEX Name Plate

3001EA041   SHT. 1   OF 1

	SCALE NONE	ISSUE	DATE	CHANGE	APPROVED BY
		3	01/JUL/10	ADD Certi. MED	J.Y.JIN
		4	12DEC/11	ADD Certi. No.	Jeffrey L.
		5	24/APR/12	CHANGED Tamb.	Jeffrey L.
		6	03/MAY/12	Adjusted Description	Jeffrey L.
		7	03/SEP/12	Add Country of Origin	Jeffrey L.
		8	05/OCT/12	Add "Refer To Manual"	Jeffrey L.
		9	05/SEP/13	Change Pmax to 5.5	Jeffrey L.
		10	10SEP/13	Change Cert. Mark	Jeffrey L.
		11	25/AUG/15	ADD Certi. EAC	Jeffrey L.
		12	23/AUG/17	ADD Certi. RoHs	Jeffrey L.

MATERIAL

FINISH

3001EA041   SHT. 1

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18.6 Sensepoint XCD UL Name Plate

Honeywell Sensepoint XCD
Honeywell Analytics Inc. Lincolnshire, IL, USA 60069
Gas Detector for use in Hazardous Locations
as to fire, Electrical Shock, Explosion Hazards Only.
Cl I Div 1 & 2, Grp B,C,D; Cl II Div 1, Grp E,F,G;
Cl II Div 2, Grp F,G; Cl I, Zone 1, Grp IIB+H2 Haz Loc.
Read Sensepoint XCD Manual Prior to Use.
Temp. Code T4, 12~32Volts DC, Pmax=3W,
Relay Ratings 3x5A @250VAC, Tamb.-40℃ To +75℃
TÜV 11.0270, Ex d IIC T6 Gb, Ex tb IIIC T85 ℃ Db, IP66
P/N :
S/N :

ATENÇÃO - NÃO ABRA QUANDO ENERGIZADO
OU NÃO ABRA ONDE UMA ATMOSFERA EXPLOSIVA
POSSA ESTAR PRESENTE

WARNING: To reduce the risk of Hazardous Atmos-
pheres, Disconnect the equipment from supply circuit
before opening. Keep tightly closed when in opera
tion. Conduit runs must have a seal fitting within
18 inches of the enclosure.   Made in Korea

CLASSIFIED c(UL)us 35YL

Segurança TÜV INMETRO OCP 0004

SCALE 2/1

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DR'N BEN   16 / MAY / 08

TITLE   Sensepoint XCD UL Name Plate

SCALE NONE

ISSUE 1   DATE 09DEC08   CHANGE REVISION   ACTIONED BY

3001EU041 SHT. 1 OF 1

1	CHANGE REVISION	09DEC08	J.Y.JIN
2	CHANGE SENTENCE	06JAN09	J.Y.JIN
3	CHANGE SENTENCE	15JAN09	J.Y.JIN
4	REMOVE "CLASS2"	24JAN09	J.Y.JIN
5	CHANGE SENTENCE	27JUN09	J.Y.JIN
6	CHANGE LOGO	18/AUG/09	J.Y.JIN
7	INMETRO LOGO	01DEC/09	J.Y.JIN
8	INMETRO CODE	19MAR/12	Jeffrey L.
9	CHANGE TEMP.	30MAR/12	Jeffrey L.
10	Add Country of Origin	03SEP/12	Jeffrey L.

MATERIAL

FINISH

TOLERANCES TO BE AS SPECIFIED
BELOW UNLESS OTHERWISE STATED.
DIMS.   2 DP ± 0.1 mm
    1 DP ± 0.25 mm
    NONE ± 0.4 mm
    ANGULAR ± 1/2 °
HOLES.   ø 0 to 8   + 0.08 / − 0.0
    ø 8 to 14   + 0.1 / − 0.0
    ø 14 to 25   + 0.12 / − 0.0

ALL DIMENSIONS IN MILLIMETRES
UNLESS OTHERWISE STATED.
AND APPLY AFTER PLATING

THIS DRAWING IS TO BS 8888

REMOVE ALL BURRS AND
SHARP EDGES

SURFACE TEXTURE VALUES ARE
IN um Ra AND TO BS 1134

Honeywell

18.7 Sensepoint XCD Warning Tag

NOTES:

1. The surface shall be flat and the words be readable.
2. The shall be no burr around.
3. Etching depth: 0.1mm
4. TEXT ON BOTH SIDES OF LABEL

CAUTION:
FOR SAFETY
REASONS THIS
EQUIPMENT MUST BE
OPERATED AND
SERVICED BY
QUALIFIED
PERSONNEL ONLY.
READ AND
UNDERSTAND
INSTRUCTION
MANUAL
COMPLETELY
BEFORE OPERATING
OR SERVICING

FRONT

ATTENTION:
POUR DES RAISONS
DE SÉCURITÉ, CET
ÉQUIPEMENT DOIT
ÊTRE UTILISE,
ENTRETENU ET
RÉPARÉ
UNIQUEMENT PAR UN
PERSONNEL
QUALIFIÉ. ÉTUDIER
LE MANUEL
D'INSTRUCTIONS EN
ENTIER AVANT
D'UTILISER,
D'ENTRETENIR OU DE
RÉPARER
L'ÉQUIPEMENT

BACK

0.5

R18.5

Ø3.30

37

32.5

77

Honeywell

3001EU048   SHT. 1

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TOLERANCES TO BE AS SPECIFIED
BELOW UNLESS OTHERWISE STATED.
DIMS.   2 DP ± 0.1 mm
         1 DP ± 0.25 mm
         NONE ± 0.4 mm
         ANGULAR ± 1/2 °
HOLES.   Ø 0 to 8   + 0.08 − 0.0
         Ø 8 to 14   + 0.1   − 0.0
         Ø 14 to 25 + 0.12 − 0.0

ALL DIMENSIONS IN MILLIMETRES
UNLESS OTHERWISE STATED.
AND APPLY AFTER PLATING

THIS DRAWING IS TO BS 8888

REMOVE ALL BURRS AND
SHARP EDGES

SURFACE TEXTURE VALUES ARE
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MATERIAL BS970:PART3:1991:316S11

FINISH

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| SCALE 1/1 | DR'N BEN | DRN BEN | 22/SEP/08 |
| ISSUE A | TITLE | TRANSMITTER WARNING_TAG | |

1   20/OCT/08   22/SEP/08   DATE

CHANGE P/N   NEW DRAWING   CHANGE
J.Y.JIN   J.Y.JIN   APPROVED BY

3001EU048

SHT. 1
OF 1

18.8 Sensor Cartridges Label

Honeywell

Gas Type

Honeywell Analytics Inc.
0344 Lincolnshire, IL, USA 60069
Sensepoint XCD
Disposable Sensor P/N :
S/N : SIIPPPYYWWNNNN
Rev.
WARNING : DO NOT SEPARATE WHEN ENERGISED
Revision Number

II 2 GD, Ex IIC Gb T6(Ta -40℃ to +65℃)
T4(Ta -40℃ to +75℃)
Ex tb IIIC Db IP66 T85℃(Ta -40℃ to +65℃)
T135℃(Ta -40℃ to +75℃)
Baseefa08ATEX0316X, IECEx BAS 08.0104X
TÜV 11.0271 X
Max. Rating/Valores Max. : 4.0V, 250mA, 1W
ATENÇÃO - NÃO SEPARE QUANDO ENERGIZADO

Segurança

SERIAL NUMBER EXAMPLE:
S/N: SIIPPPYYWWNNNN
Sequence number
Week of MFG
Year of MFG
Part Code
Issue State
SUPPLIER CODE

NOTE
1. LEGEND TO BE THERMALLY TRANSFER
PRINTED IN BLACK ONTO BLANK LABEL.

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		SCALE NTS	DRAWING BEN HUR	12/ SEP/ 08
			TITLE	
MATERIAL	Matt metallized PET 50um		Sensor Cartridge Label Artwork Drawing	
FINISH	Adhesive: Acrylic	ISSUE A	3001EA053	SHT. 1 OF 1

						DATE	12/SEP/08
ISSUE	A	1	2	3	4	5	6
DATE		10NOV/08	04MAR/09	02/APR/09	21/NOV/11	24/APR/12	03MAY/12
CHANGE	NEW DRAWING	REVISED	ADD NOTE	Change IP Grade	Combine Certification	Changed Tamb.	Adjusted Description
APPROVED BY	J.Y.JIN	J.Y.JIN	J.Y.JIN	J.Y.JIN	J.Y.JIN	Jeffrey L.	Jeffrey L.
							Jeffrey L.

3001EA053 SHT. 1

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18.9 EC Declaration of Conformity

A full EC declaration of conformity is available on the CD accompanying the product. This document lists the European Standards with which the Sensepoint XCD complies.

19 Cross Interference and Cross Calibration

19.1 Cross Interference Table for Toxic and Oxygen

This below table shows the relative cross sensitivity of the Sensepoint XCD to other gases. "Gas Type" indicated the XCD sensor type fitted to the XCD. "Gas Type Applied" indicates the gas that may be applied to that sensor and the resulting Reading.

Gas type	Gas Type Applied	Concentration	Unit	Reading	Unit
O_2	Carbon Dioxide	5	%vol	0.1	%vol (change O_2 reading) per %vol CO_2
H_2S	Ammonia	50	ppm	0	ppm H_2S
	Carbon Monoxide	100	ppm	<2	ppm H_2S
	Carbon Dioxide	5000	ppm	0	ppm H_2S
	Chlorine	0.5	ppm	0	ppm H_2S
	Ethylene	100	ppm	0	ppm H_2S
	Hydrogen	100	ppm	0	ppm H_2S
	Hydrogen Sulfide	10	ppm	10	ppm H_2S
	Nitrogen Monoxide	25	ppm	0	ppm H_2S
	Nitrogen Dioxide	3	ppm	0	ppm H_2S
	Sulfur Dioxide	2	ppm	0	ppm H_2S
CO	Acetone	1000	ppm	0	ppm CO
	Acetylene	40	ppm	80	ppm CO
	Ammonia	100	ppm	0	ppm CO
	Carbon Monoxide	100	ppm	100	ppm CO
	Chlorine	2	ppm	0	ppm CO
	Ethanol	2000	ppm	3	ppm CO
	Ethylene	100	ppm	85	ppm CO
	Hydrogen	100	ppm	20	ppm CO
	Hydrogen	25	ppm	0	ppm CO
	Iso-Propanol	200	ppm	0	ppm CO
	Nitrogen Monoxide	50	ppm	8	ppm CO
	Nitrogen Dioxide	800	ppm	20	ppm CO
	Sulfur Dioxide	50	ppm	0.5	ppm CO
H_2	Carbon Monoxide	300	ppm	≤60	ppm H_2
	Hydrogen Sulfide	15	ppm	<3	ppm H_2
	Sulfur Dioxide	5	ppm	0	ppm H_2
	Nitrogen Monoxide	35	ppm	»10	ppm H_2
	Nitrogen Dioxide	5	ppm	0	ppm H_2
	Chlorine	1	ppm	0	ppm H_2
	Hydrogen Cyanide	10	ppm	»3	ppm H_2
	Hydrogen Chloride	5	ppm	0	ppm H_2
	Ethylene	100	ppm	»80	ppm H_2

19.2 Cross Calibration Flammable Gas Detector (Not tested as part of the performance approval)

For greater accuracy, a catalytic gas detector should be calibrated using a certified gas/air mixture equal to 50% LEL of the actual target gas intended to be monitored.

However, it is not always practical to obtain every detectable type of hydrocarbon gas in a calibration-ready, certified and verifiable form. Therefore, it is possible to carry out a "cross calibration" using another hydrocarbon gas/air mixture.

When the Sensepoint XCD Combustible LEL sensor is to be calibrated with a gas which is different to the gas or vapour to be detected, the following cross calibration procedure may be followed:

> **Caution: Where the user calibrates any sensor using a different gas, responsibility for identifying and recording calibration rests with the user. Refer to the local regulations where appropriate.**

Notes:
1. Table 14 lists a selection of hydrocarbon compounds and states a reference figure or "Star Rating" according to the reaction they produce in relation to other hydrocarbons.
2. An eight star (8) gas produces the highest output, while a one star (1*) gas produces the lowest output.*

No.	Gas	Star Rating
1	Acetone	4*
2	Ammonia	7*
3	Benzene	3*
4	Butanone	3*
5	Butane	4*
6	Butyl acetate	1*
7	Butyl acrylate	1*
8	Cyclohexane	3*
9	Cyclohexanone	<1*
10	Diethyl ether	4*
11	Ethane	6*
12	Ethanol	5*
13	Ethyl acetate	3*
14	Ethylene	5*
15	Heptane	3*
16	Hexane	3*
17	Hydrogen	6*
18	Methane	6*
19	Methanol	5*
20	MIBK	3*
21	Octane	3*
22	Pentane	3*
23	Propane	5*

24	Propan-2-ol	4*
25	Styrene	2*
26	Tetra hydrafuran	4*
27	Toluene	3*
28	Triethylamine	3*
29	Xylene	2*

Table 14 . Star Rating of Gases

To cross calibrate the Sensepoint XCD flammable gas detector:
(1) Obtain the star rating for both the calibration test gas and the gas to be detected from Table 14
(2) These values may then be used in Table 15 to obtain the required calibration span setting when a 50% LEL test gas is applied to the detector.

*Rating of Calibration Gas	*Rating of Gas to be Detected							
	8*	7*	6*	5*	4*	3*	2*	1*
8*	50	62	76	95	-	-	-	-
7*	40	50	61	●	96	-	-	-
6*	33	41	50		78	98	-	-
5*	26	33	40	50	63	79	100	-
4*	21	26	32	40	50	63	80	-
3*	-	21	26	32	40	50	64	81
2*	-	-	-	25	31	39	50	64
1*	-	-	-	-	25	31	39	50

Note: These settings must only be used with a calibration gas concentration of 50% LEL.
Table 15. Calibration span setting

(3) If a sensor is to be used to detect a gas other than that for which it was calibrated and there is no intention to use an equivalent calibration gas to re-calibrate the sensor, then the required correction factor may be obtained from Table 16.

The reading shown on the gas detector controller or transmitter display should be multiplied by this number in order to obtain a more accurate gas concentration result.

Sensor calibrated to detect	Sensor used to detect							
	8*	7*	6*	5*	4*	3*	2*	1*
8*	1.00	1.24	1.52	1.89	2.37	2.98	3.78	4.83
7*	0.81	1.00	1.23	1.53	1.92	2.40	3.05	3.90
6*	0.66	0.81	1.00	1.24	1.56	1.96	2.49	3.17
5*	0.53	0.66	0.80	1.00	1.25	1.58	2.00	2.55
4*	0.42	0.52	0.54	0.80	1.00	1.26	1.60	2.03
3*	0.34	0.42	0.51	0.64	0.80	1.00	1.27	1.62
2*	0.26	0.33	0.40	0.50	0.63	0.79	1.00	1.28
1*	0.21	0.26	0.32	0.39	0.49	0.62	0.78	1.00

Table 16. Correction factors

Notes:
1. Since catalytic sensors require oxygen for correct operation, a mixture of gas in air should always be used for calibration purposes.
2. Assuming average performance of the sensor, the sensitivity information in Tables 14 To 16 is normally accurate to + or - 30%.

Working Example:
If the target gas to be detected is 0-100%LEL Ethylene and the only calibration gas available to re-calibrate the sensor is Methane (at 50% LEL concentration), the procedure is as follows:
(1) Look up the star rating for each gas in Table 14:

Gas No. 14, Ethylene = 5*
Gas no. 18, Methane = 6*

(2) Then, look up the span settings for a 50% LEL calibration gas in Table 15 by selecting the row of figures next to the 6* in the "calibration gas" column. Select the figure in the 5* column of the "gas to be detected" section. The figure is 62.

(3) This means that during re-calibration, the span gas setting on the gas detector transmitter or controller should be set to 62% LEL to give an accurate measuring scale for 0-100%LEL Ethylene, when using 50% LEL Methane as the calibration gas.

Please contact your local Honeywell Analytics sales or service distributor, or regional office should further clarification or additional information be required.

19.3 Meter Multiplication Factors for Sensepoint XCD-IR Propane

It is possible to apply a linear cross reference factor to the output of a sensor characterized for propane and achieve the results shown in the graph below.
Reasonable accuracy is maintained to at least the 50% LEL equivalent values of the cross-referred gasses.

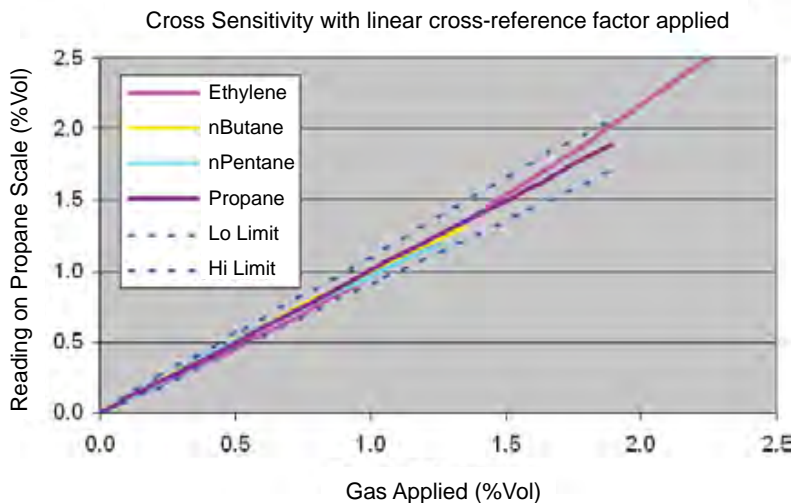### XCD IR Propane Sensor (Full scale 2% Vol/100%LEL)

Diagram 18. Sensepoint XCD-IR (Propane) Sensor with linear cross-reference factor applied

Use the following multiplying factors to cross-refer to the propane reading:

Gas	Multiplication Factor
Ethylene	3.43
nButane	0.97
nPentane	0.89

Table 17. Multiplying Factors

Caution: These factors only apply to gas concentrations expressed in % Volume terms. When using a linear cross reference factor the temperature compensation is based upon propane, and there may be errors at temperatures away from the calibration temperature.

NOTE
Honeywell Analytics recommends that users verify the accuracy of their instruments using test gasses wherever possible. Cross-referred measurements should be used as a guide only, not as absolute values.

XCD Transmitter

Appendix A - Modbus® Protocol A-2

A.1 Modbus and the XCD

The XCD gas detector may be fitted with the optional Modbus board. Authoritative information on the MODBUS Upgrade Kit can be found at www.modbus.org. The XCD supports Modbus/RTU over an RS-485 physical layer. The interface is isolated and includes a switchable 120 Ohm termination resistor. Baud rates 9600 or 19,200 are supported with 19,200 as the default. Most of the operations that are possible with local user interfaces can also be performed using the Modbus interface. This includes configuration operations. However, this Appendix only describes how to monitor XCD status using Modbus.

See Section 4.1.1 for information on installing the optional Modbus hardware. See Section 4.1.1 Configure Menu – Set ID Settings for information on setting the Modbus baud rate and Parity using the local user interface.

A.2 Modbus Registers

ModBus Register Address	Information	R/W	Type	Size	Note
30001	Main SW Version of XCD	R	u8	1	
30002	EEP Version of XCD	R	u8	1	
30003	WatchDog s/w Version of XCD	R	u8	2	
30004	Location string	R	string[12]	6	
30010	ModBus slave ID	R	u8	1	
30011	Monitor Status	R	u16	1	Upper byte : Function Lower byte : Instrument Mode
30012	Inhibit current(mA)	R	u8	1	20 means 2.0mA
30013	Reserved	R	u16	1	
30014	Active Alarm	R	u32	2	bit 0 Alarm 1 is active bit 1 Alarm 2 is active
30016	Latched Alarm	R	u32	2	bit 0 Alarm 1 is active bit 1 Alarm 2 is active
30018	Active Fault	R	u32	2	Upper Byte: fault Lower Byte:warning Bit 0:W1~Bit 6:W6 Bit 7:F1~Bit 11:F5
30020	Latched Fault	R	u32	2	Upper Byte: fault Lower Byte:warning Bit 0:W1~Bit 6:W6 Bit 7:F1~Bit 11:F5
40001	System ID code	R	u16	1	Upper Byte : Type Code : 0x25 Lower Byte : My Address
40002	System ID code	R	u16	1	Upper Byte : Type Code : 0x25 Lower Byte : My Address : Dummy Spacer
40003	Gas reading	R	f32	2	
40005	Fault and Warning	R	u8	1	Fault = 1100 + Number Warning = Number as is
40006	Alarm, fault and warning state	R	u8	1	bit 0 Alarm 1 is active bit 1 Alarm 2 is active bit 2,3 for future expansion bit 4 Warning is active bit 5 Fault is active bit 6,7 for future expansion Note: Latching relay setting latches Modbus values in register 40006.
40007	Monitor state monitering	R	u8	1	1 : Normal 2 : Warm Up after power on 3 : Inhibit 12 : Calibration
40008	Reserved	R	u16	1	
40009	Calibration Due	R	f32	2	
40011	Measuring Unit	R	u8	1	4 : PPM 3 : %Vol 5 : %LEL 1 : mg/m3v
40012	Peak Reading	R	f32	2	Peak Reading
40014	Reserved	R	u16	3	
40017	Temperature (°C)	R	s16	1	
40018	Reserved	R	u16	28	
40046	Measuring Gas name string	R	string[14]	7	
40053	Reserved	R	s16	1	
40054	Temperature (°F)	R	s16	1	
40055	Reserved	R	u16	1	
40056	Relay Status	R	u8	1	1 : Energized, 0 : De-energized
40057	Power Supply	R	f32	2	
40059	Calibration Interval	R/W	u16	1	
40060	Alarm Type	R/W	u8	1	High nibble : Alarm 2 Type Low nibble : Alarm 1 Type 0: Disable, 1: Rising, 2:Falling
40061	Inhibit timeout	R/W	u16	1	
40062	Relay configuration	R/W	u8		Bit: 0 ~ 2 : Relay Type1 ~ Relay Type3 Bit: 3~5 : Relay Sstatus1 ~ Relay Status 3 Bit: 6 : Relay Latch Status

Find out more

www.honeywellanalytics.com

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Honeywell

12573

FirePro. Reinventing Fire Suppression

SIRENA SIR-E LED-FA

EN54-3 approved multifunctional electronic LED beacon sounder. Developed with a multichannel technology, SIR-E LED FA allows two separate levels of alarm (Stage 1 alarm and Stage 2 alarm) controllable via independent contacts. The device is multitone tones enriched by a strobe effect flashing light.

Mechanical features
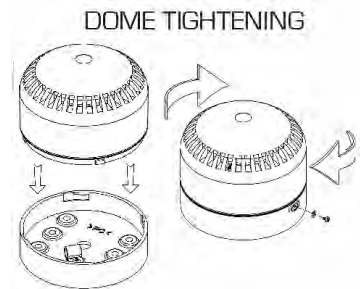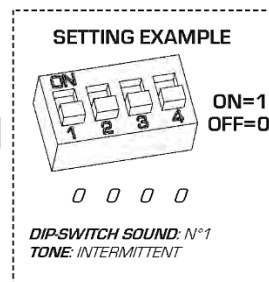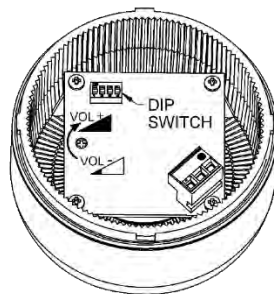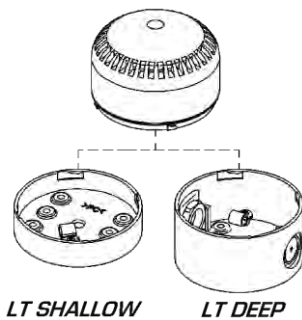Self-extinguishing PC body with high impact resistance, suitable for outdoor applications - IP65.

Acoustic and optical features
- Electromagnetic buzzer. 4 Bright LEDs over 360°.
- Two levels of alarm:
  - PRE-ALARM, a powerful up to 100 dB electronic tone (selectable via dip switch 12 tones)
  - ALARM, a powerful up to 100 dB electronic tone (Not Selectable - 1 continuous tone).

CE

Specifications		
Voltage:	12 – 24vDC	
Current:	12v - Max 120mA	24v - Max 110mA
Sound Output:	100dB(A)	
Flash Rate:	60/min (1Hz)	
Temperature:	-30 C to +70 C	
IP Rating:	IP 65	

IMPORTANT
This siren cannot be connected to S1 or S2 outputs on Sigma XT Panel.
To achieve the 2 separate alarm signals must connect to Stage 1 and Stage 2 Alarm Relays. Alternate wiring can be from Sign Trigger terminals.

LT SHALLOW   LT DEEP

SETTING EXAMPLE
ON=1 OFF=0
DIP-SWITCH SOUND: N°1
TONE: INTERMITTENT

DOME TIGHTENING

STAGE 1 ALARM -Switch Bank		
No.	DIP Switch	Description
1	0 0 0 0	General Purpose Warning
2	1 0 0 0	Evacuation Warning 1
3	0 1 0 0	Evacuation Warning 2
4	1 1 0 0	Fire Warning
5	0 0 1 0	Sweep 1
6	1 0 1 0	Sweep 2
7	0 1 1 0	Bi Tone 1
8	1 1 1 0	Sweep 3
9	0 0 0 1	Bi Tone 2
10	1 0 0 1	Bi Tone 3
11	0 1 0 1	Australian Signal AS 4428
12	1 1 0 1	Australian Signal AS 1670
STAGE 2 ALARM -No Selectable Tone		
13	Not Selectable	Continuous Tone

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Stage 1 Alarm
Stage 2 Alarm
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