

ADDRESSABLE FIRE ALARM SYSTEM

CONSULTANT SPECIFICATION

Contents

1	Scope	4
2	Standards	5
2.1	Qualification of Manufacturers.....	5
3	Fire Alarm Control Panel	6
3.1	Functional Description	6
3.2	Additional Components	7
3.3	Configuration	7
3.4	Panel Construction.....	9
3.5	Panel Indications.....	9
3.6	Display.....	10
3.7	Panel Controls.....	10
3.8	Remote Monitoring Signals.....	11
3.9	Output to Fire and Fault Routing	11
3.10	Software.....	11
3.11	Sounder Connections.....	12
3.12	Fault Reporting.....	12
3.13	System Management.....	13
4	Devices.....	14
4.1	Basic Device Requirements.....	14
4.2	Addressable Units	14
4.3	Conventional Units.....	14
4.4	Photoelectric Smoke Detectors	15
4.5	Multi-Sensors – Analogue Addressable	16
4.6	Duct Smoke Detectors	17
4.7	Heat Detectors.....	17
4.8	Detector Base.....	17
5	Other Devices.....	18
5.1	Addressable Manual Call Points.....	18
5.2	Addressable Loop Powered Beacon.....	18
5.3	Addressable Sounder Module.....	18
5.4	Conventional Detector Interface Module.....	19
5.5	Addressable Relay Controller Module	19
5.6	Addressable Mains Relay Controller Module	19
5.7	Addressable Input Monitoring Module	19
5.8	Short Circuit Isolator Base.....	20
5.9	Loop Powered Sounder Beacon Base	20
5.10	Loop Powered Sounder Base	20
5.11	Loop Powered Wall Sounder	20
5.12	Loop Powered Wall Sounder Beacon.....	21
5.13	EN54-23 Compliant Loop Powered Wall Beacon.....	21
5.14	EN54-23 Compliant Loop Powered Ceiling Beacon	21
5.15	Photoelectric Beam Smoke Detectors	21
5.16	Infra-Red Flame Detectors	22
6	Sounders	22
7	Wireless Fire Detection	22
7.1	Wired To Wireless Translation Module	22
7.2	Wireless Input Module.....	22
7.3	Wireless Output Module.....	22
7.4	Wireless Manual Call Points.....	22

7.5	Wireless Sensors	23
7.6	Wireless Wall Sounders	23
7.7	Wireless Base Sounders	23
7.8	Wireless Beacon.....	23

1 Scope

Furnish a complete analogue addressable, electrically supervised, zone annunciation, fire detection and alarm system as specified herein and in accordance with the supplied drawings.

The system shall include but not be limited to, one or more graphical touch screen control panels, repeater panels, and sensors, call points, audible and visual alarm indicating devices and other accessories required to provide a complete fire detection and alarm system.

The fire alarm system shall be wired as 2 core signal loops. 24 V DC power wiring shall be installed to alarm sounders via addressable sounder modules or via conventional monitored sounder outputs within the control panel.

Loop powered sounders shall be connected directly to the signal loops.

2 Standards

The fire detection system shall be designed, installed and commissioned in accordance with;

- BS5839-1:2013 - Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises

The alarm control panel will be independently certified to the following;

- EN54-2:1997+A1:2006 – Control and Indicating Equipment
- EN54-4:1998 – Power Supplies

The products will meet the requirements of the Construction Products Regulation (CPR) and Certificates of Constancy of Performance prepared by the approval body, will be available from the manufacturer.

Declaration of Performance (DoP) certificates will also be available from the product manufacturer.

All detection devices, audible warning devices and ancillary interfaces shall be independently certified as complying with the relevant EN54 standard.

2.1 Qualification of Manufacturers

Manufacturers of the fire alarm system product supplied will have been in the business of manufacturing Fire Alarm products for at least five years.

The equipment manufacturer shall operate a Quality Management system in accordance with ISO 9001:2000.

The equipment shall be manufactured and regularly audited under a recognised Factory Control Procedure (FCP), such as the BSI Kitemark scheme.

3 Fire Alarm Control Panel

3.1 Functional Description

The fire alarm control panel (FACP) shall be the central processing unit of the system, receiving and analysing signals from fire sensors, providing audible and visual information to the user, initiating automatic alarm response sequences and providing the means by which the user interacts with the system.

User interaction with the system will be by means of an intuitive full colour resistive touch screen graphical display. User permissions to access the FACP panel menu and control options will be provided by means of a key switch or a 5 or 6 digit passcode.

The FACP shall be certified as meeting the requirements of EN54-2 and EN54-4 by a suitable, notified body. A certificate of product approval and certificate of constancy of performance shall be made available for inspection as evidence of certification.

The FACP shall be easily configurable to meet the exact detection zone and output mapping requirements of the building. 2000 detection zones shall be capable of being configured, each with an 80 character location message.

For networked systems, it will be possible to map any detection zone to more than one panel, to allow vertical risers (stairwells) to be easily configured and supported.

The FACP shall be microprocessor based. Operating programs and configuration data shall be contained in re-configurable non-volatile memory. Retention of the memory shall not rely on any form of battery or capacitor back-up device. The FACP shall incorporate separate processors for loop processing and central processing.

The detection loops will continue to work autonomously and will audibly and visually report a fire with the minimum requirements of EN54-2, in the event of a failure of the main display and user interface.

A combination of Apollo, Argus Security and Hochiki protocol detection devices will be supported on a single panel, in banks of two loops.

Up to 16 detection loops will be supported on a single panel, by means of a number of 2-loop plug in cards.

The FACP will have a comprehensive event log, which has a capacity of 10,000 events stored in non-volatile memory, with a time stamp of 1 second resolution. This log will be maintained in the event of a total loss of power and can be downloaded into csv file format using the panel configuration software.

Provision shall be made for each addressable loop to be sub-divided into geographical zones. The section of wiring corresponding to each zone circuit shall be protected from faults in other sections by line isolator modules.

In order to facilitate re-configuration and system extension, the allocation of addresses to devices shall be independent of their physical arrangement on the loops.

Up to 240 individually addressed standard devices shall be configured on each addressable loop. Loop powered sounders incorporated as a sensor bases shall be available.

The FACP shall have the capability to support sub-addressing of addressable. Inputs and Outputs should be controlled independently.

It shall be possible to fit a 40-column printer to the FACP which will print system events automatically and logged data upon request.

The FACP shall incorporate a real time clock to enable events to be referenced against time and date. In networked systems, a master clock panel will synchronise all panel clocks every 24 hours.

3.2 Additional Components

It shall be possible to fit the FACP with a network board to allow up to 128 control panels and repeater panels to communicate with each other. The network shall be fully fault tolerant and shall continue to function normally under any single fault condition.

It shall be possible to fit the FACP with plug-in communication board to allow remote monitoring of a network of control panels. This board will support IP, RS485 and RS232 interfaces and will act as a firewall, to prevent malicious attempts to remotely control the FACP and fire system.

This communication board will enable connectivity to the fire alarm PC based graphics system.

It shall be possible to fit up to thirty-two, sixteen-way input/output modules, relay modules, sounder modules or conventional zone modules or any combination thereof to each control panel. Modules will directly plug into available spare expansion slots within the panel, or via a remote boxed I/O enclosure with backplane assembly and optional power supply unit.

3.3 Configuration

It shall be possible to perform configuration updates on site using a portable personal computer and a Microsoft Windows® based configuration utility. This facility shall allow the following parameters to be set:

System

- Produce a configuration file which contains data for up to 128 panels or repeaters connected together as a network.
- Set cause and effect tables for any combination of devices or zones of devices to operate devices, zones of devices or functions on any panel or panels connected to the network.
- Upload and view graphically the configuration from a single panel or entire network of panels.

Control Panel

- Panel name (network identity, 30 characters minimum)
- Configure up to 64 user login accounts with up to 28 different profile variations
- Select sounder ringing mode as common, zonal or two stage

- Select the global first and second stage delay times for any delayed output to between 0 and 10 minutes.
- Set number of loops on panel as 2 through to 16, in increments of 2 loops
- Set number of zones on panel as 48 or 144
- Set the four onboard sounder outputs to either Class A (loop) or Class B (spur with end of line) operation
- For each two loop card
 - Set loop sounder volume globally
 - Select tone patterns for different event types
- Specify the daily calibration time for detection devices
- Specify the master clock panel for networked systems
- Set start and end times for day night mode for each day of the week

Zones

- Allocate an 80-character zone location message

Detectors

- Allocate a zone (0-2000)
- Set a delay before the panel responds to a fire signal from (0-180 seconds)
- Indicate pre-alarm
- Bypass any output delays when activated to fire
- Set day sensitivity and night sensitivity separately
- Address loop powered base sounders
- Allocate an 80-character location text message.

Call points

- Allocate a zone (0-2000)
- Allocate an 80 character location text message

Switch units (input)

- Allocate a zone for each input and the device itself (0-2000)
- Define input action as fire, faulty, pre-alarm, evacuation, alert, security alarm, silence alarm, reset, transparent, disablement or test mode.
- Change the input action message from the default to any one of the above or to any one of a user defined library of 10 additional action messages.
- Set a delay before the panel responds to a fire signal (0-180 seconds)
- Select whether the input requires the control panel to be reset or is self-clearing upon removal of the input.
- Bypass any output delays when activated
- Allocate an 80-character location text message

Relay or sounder units (output)

- Allocate a zone for each input and the device itself (0-2000)
- Define whether the device responds to evacuate inputs, alert inputs, as a sounder (default ringing) and switches off when the Silence Alarms control is operated
- Permit the output to operate on any pre-alarm, technical alarm, security or fault event.
- Has a delay before operating (0 to 10 minutes in two stages)
- Allocate an 80-character location text message

Loop powered sounders

- Allocate a zone (0-2000)

- Permit the output to operate on any pre-alarm, technical alarm, security or fault event.
- Has a delay before operating (0 to 10 minutes in two stages)
- Allocate an 80-character location text message.

Cause and Effects

- 2000 cause and effect entries
- 40000 inputs or outputs can be allocated to these 2000 entries including
- Zones
- Input devices
- Outputs devices
- All cause and effects operate network wide, allowing any combination of inputs across the network to control any combination of outputs on any panel

Network

- Default to a “peer-to-peer” system, where all events are displayed and processed on all other panels on the network
- To permit each panel to be configured to display and process selected event types from any other panel on the network
- Permit each panel to be configured with sequential / unique loop numbers for instances where several panels protect a single building
- Support daily time synchronisation from a master clock panel, to ensure that all panels event logging information is accurate

3.4 Panel Construction

The housing containing the FACP shall be of metal construction and shall be capable of being surface or semi-flush mounted. It shall be complete with cable knocks-outs in sufficient quantity to accommodate all likely cabling requirements.

The housing shall afford a minimum ingress protection to IP30 and it shall not be possible to open the FACP without the use of a special tool or key.

The panel will be constructed in a way that ensures that any complex electronic circuit boards can easily be replaced without the need to disrupt the field wiring connections. All field cable terminations will be made into a passive backplane assembly.

The ability to support a family of plug-in addition cards will be provided, so that the product can easily be modified with additional sounder outputs, conventional zone interfaces, plant control relays or switch monitor/indicator driver interfaces.

3.5 Panel Indications

The FACP shall monitor the status of all devices on the addressable loops for fire, short-circuit fault, open-circuit fault, incorrect addressing, unauthorised device removal or exchange, pre-alarm condition and contaminated detector condition.

The FACP shall also monitor the status of internal connections and interfaces including charger and batteries.

The FACP shall provide the following discrete visual indications:

○ FIRE	Red LED Indicator
○ GENERAL FAULT	Yellow LED Indicator
○ SYSTEM FAULT	Yellow LED Indicator
○ GENERAL DISABLEMENT	Yellow LED Indicator
○ FIRE PROTECTION ACTIVATED	Red LED Indicator
○ FIRE PROTECTION FAULT	Yellow LED Indicator
○ FIRE ROUTING ON	Red LED Indicator
○ FIRE ROUTING FAULT/DISABLED	Yellow LED Indicator
○ TEST MODE ON	Yellow LED Indicator
○ DELAYS ACTIVE	Yellow LED Indicator
○ SOUNDER FAULT/DISABLED	Yellow LED Indicator
○ POWER ON	Green LED Indicator

3.6 Display

In addition to the indications above, the FACP shall have an integral full colour 7" VGA display with resistive touch screen.

The display shall incorporate a backlight. An ambient light sensor will be provided to allow automatic adjustment of the display backlight to ensure clear visibility across variable light conditions. A configuration option will be available to maintain the light at maximum brightness unless the panel only being supplied from the standby batteries.

The display shall be capable of simultaneously indicating the number of outstanding events and their types as well as the current event.

3.7 Panel Controls

The panel shall be provided the following manual controls via the resistive touch screen:

- BUZZER SILENCE
- SILENCE ALARMS / RE-SOUND ALARMS
- RESET SYSTEM
- ACTIVATE CONTROLS / LOGOUT
- DELAYS CONTROL

Only the available controls will be displayed, depending on the panel state and login permissions. Support for 24 user defined programmable soft buttons will be provided. These can be configured to be displayed only for selected user login accounts.

3.8 Remote Monitoring Signals

The FACP shall contain at least three programmable inputs to allow interconnection to other systems.

The FACP shall contain at least two programmable outputs to allow interconnection to other systems.

The FACP shall be capable of monitoring and controlling remote site devices, such as relays for the control of plants and dampers directly from the addressable loops.

The FACP shall be capable of monitoring fire doors such that, in the event of a fire alarm condition, an event is generated to warn of the failure of a fire door to close.

3.9 Output to Fire and Fault Routing

The FACP will provide monitored outputs to signal to Fire and Fault Routing equipment. Monitored inputs will be provided to signal receipt of the Fire/Fault routing signals from the remote location. A Fire Routing indication will be provided by a separate LED indicator on the panel fascia when the fire routing signal has been operated.

3.10 Software

The FACP shall have, as a standard software enhancement, the ability to annunciate a pre-alarm condition designed to give the earliest possible warning of potential fire condition without raising the full alarm condition.

The FACP shall have, as a standard software enhancement, the ability to automatically adjust the alarm threshold levels to compensate for changes in detector sensitivity due to contamination over a period of time.

The FACP shall have, as a standard software enhancement, the ability to verify any alarm conditions in accordance with EN54-2 Clause 7.12 Dependency (Type A, B and C) requirements.

The FACP shall have, as a standard software enhancement, the ability to provide an indication that a detector is nearing a level of contamination, which requires that it be replaced or serviced.

The FACP shall have, as a standard software enhancement, the ability to provide automatic warning that a detector has reached a level of contamination, which requires that it be replaced or serviced.

The FACP shall have, as a standard software enhancement, the ability to synchronise loop data transmission to eliminate the possibility of data corruption due to cross-talk or similar effects.

3.11 Sounder Connections

The FACP shall provide the necessary outputs to separately operate a minimum of two monitored circuits of common system sounders. The sounder outputs can be configured as 2 x Class A (loop monitored), 4 x Class B (end of line monitored) or 1 x Class A and 2 x Class B combinations.

Each output shall be capable of driving a sounder load of up to 2.5A.

The FACP shall be capable of providing a two-stage alarm sounder facility that can be programmed, either on a zonal basis or common system basis, to meet the requirements of the fire authority.

Sounder outputs shall be available as follows:

- Alert, intermittent pulsed tone
- Evacuate, continuous tone

The FACP shall have the facility to change the tones of addressable sounders to provide different tones for different event types.

3.12 Fault Reporting

The FACP shall monitor all critical system components and interconnections, internal and external, such that a failure, which would prevent the correct operation of the alarm functions, causes the GENERAL FAULT indicator to light and a message to be given on the full colour touchscreen display within 100 seconds of occurrence.

The following faults shall be reported in the manner described above:

- Loop Short Circuit
- Loop Open Circuit
- Unexpected Device
- Disconnected Device
- Addressable Device Failure
- Incorrectly Configured Device Type
- Double Address Type
- System Fault (Processor)
- Low Battery
- Charger Failure
- Earth Fault Monitoring
- Battery Fault
- Mains Failure
- Sounder Wiring Open Circuit (Per Circuit)
- Sounder Wiring Short Circuit (Per Circuit)

To help fault finding and repair, the FACP shall provide text messages to indicate the location of where a fault has occurred in the system.

3.13 System Management

The FACP shall incorporate the following system management facilities:

- Isolate/re-connect individual outputs or inputs of addressable points
- Isolate/re-connect individual zones (include/exclude call points)
- Isolate/re-connect individual sounder circuits
- Isolate/re-connect all sounder devices
- Isolate/re-connect all volt-free contacts individually
- Isolate/re-connect any output defined as a plant control output
- Walk-test of a selected zone to verify detectors and sounders (silent and audible)
- System Information status information
- View the event log with filtering of
 - Between dates
 - Event types
 - Selected zones, loops and addresses
- Print the selected event log on the panel printer
- View the addressable point status
- Set date and time

Access to the facilities describe above shall be restricted to authorised persons by means of a key switch or 5 or 6 digit passcode.

The FACP shall have an event log capable of storing the last 10,000 events that have occurred. It shall be possible to view the content of the log via the graphical display. Events shall be displayed in chronological order with the newest events first. It shall be possible to filter the event log by event type, between selected dates, by zone, loop and addresses.

The FACP shall be designed so that, for each type of analogue addressable detector, the overall response time including the sensor, the signal transmission system and the fire decision algorithm, meets the requirement of European Standards.

The FACP shall be capable of isolating a group of selected detectors in areas of the building where maintenance work is carried out.

4 Devices

4.1 Basic Device Requirements

The manufacturer shall have available the following types of analogue addressable automatic sensors, for direct connection to the system addressable loops;

- Photoelectric smoke sensors
- Heat sensors
- Multi-sensors

4.2 Addressable Units

The manufacturer shall be capable of offering two-state addressable versions of the following units, taking only one address from the loop:

- Photoelectric smoke detectors
- Heat detectors
- Photoelectric beam smoke detectors
- Conventional detector interface module
- Interface to wireless (radio) detectors and call points
- Addressable sounder modules
- Addressable relay interface modules
- Addressable switch monitoring modules
- Loop powered base and wall sounders
- Loop powered visual devices such as beacons and remote indicators
- Manual call points for indoor use
- Manual call points for outdoor use
- Multiple inputs/outputs

4.3 Conventional Units

The manufacturer shall have available the following types of conventional automatic detectors, manual call points and ancillary units for connection to the system via suitable interfaces:

- Photoelectric smoke detectors
- Photoelectric beam smoke detectors
- Infra-red flame detectors
- Heat detectors
- Manual call points for indoor use
- Manual call points for outdoor use
- Visual devices such as beacons and remote indicators
- Sounders

Analogue Addressable detectors and modules must be able to transmit to the FACP an address to be used in the system configuration.

It must be possible to connect and mix automatic detectors, addressable manual call points and addressable modules within the same zone sub-division of an addressable loop.

All equipment connected to the system addressable loop, either directly or via interfaces, shall be proofed against electrical noise, high frequency pulses and electromagnetic influences from other equipment.

The manufacturer shall have available suitable equipment to test and remove or exchange all three main types of automatic point-type detectors when installed.

4.4 Photoelectric Smoke Detectors

The photoelectric smoke detectors shall be capable of detecting visible combustion gases emanating from fires and shall employ the forward light-scatter principle.

The photoelectric smoke chamber shall be equally sensitive to a wide range of combustible materials.

The detector should also incorporate a locking mechanism, so that the detector can only be removed with a special removal tool.

The design of the point-type photoelectric smoke detector sensing chamber shall be optimised to minimise the effect of dust deposit over a period of time. The chamber cover shall be removable for ease of cleaning or replacement.

The point-type photoelectric smoke detectors shall incorporate screens designed to prevent all but the very smallest of insects from entering the sensing chamber, (50 holes per square centimetre or more).

The photoelectric smoke detectors shall be designed to have high resistance to contamination and corrosion and shall include RFI screening to minimise the effect of radiated and conducted electrical interference.

The manufacturer shall have available the following versions of the point type photoelectric smoke detector to meet different applications:

- Analogue addressable
- Conventional
- Conventional – Intrinsically Safe (I.S.)

The photoelectric smoke detector shall incorporate two LEDs, clearly visible from the outside, to provide indication of alarm actuation.

In locations where the detector is not readily visible, remote indicator units shall be provided.

4.5 Multi-Sensors – Analogue Addressable

The multi-sensor should be capable of monitoring two different sensing elements:

- Photoelectric
- Thermal

The design of the point-type multi-sensor photoelectric smoke detector sensing chamber shall be optimised to minimise the effect of dust deposit over a period of time.

The detector should also incorporate a locking mechanism, so that the detector can only be removed with a special removal tool.

The point-type multi-sensors shall incorporate screens designed to prevent all but the very smallest of insects from entering the sensing chamber, (50 holes per square centimetre or more).

The multi-sensors shall be designed to have high resistance to contamination and corrosion and shall include RFI screening to minimise the effect of radiated and conducted electrical interference.

The sensor should be able to operate in the following modes:

Combined Mode

The sensor should be able to operate as a photoelectric sensor but when the ambient temperature reaches 40°C or above, the thermal elements should be capable of sensing the 'Rate of Rise' and adjust the sensitivity of the photoelectric element automatically. The sensitivity of the photoelectric should be increased via an internal algorithm.

Photoelectric Mode

The sensor should be able to return the analogue value for the photoelectric element during a normal polling sequence.

The sensor should also be able to signal to the FACP if the thermal sensing element exceeds a fixed temperature threshold.

Thermal Mode

The sensor should be able to return the analogue value for the thermal element during a normal polling sequence. The sensor should also be able to signal to the FACP if the photoelectric sensing element exceeds a pre-defined threshold.

The multi-sensor shall incorporate two LEDs, clearly visible from the outside, to provide indication of alarm actuation. The LEDs should be controlled from the FACP if the LEDs flash during the normal polling sequence.

The modes of the multi-sensor should be controlled by the FACP, when the FACP changes from one mode to another the FACP should re-calibrate the multi-sensor.

In locations where the detector is not readily visible, remote indicator units shall be provided.

The multi-sensor should have the capability of monitoring either sensing elements, if either or both of the elements fail it should be reported and displayed at the FACP.

4.6 Duct Smoke Detectors

The manufacturer shall produce standard equipment for the installation of smoke detectors in air ducts. This equipment shall be designed to accommodate the manufacturer's standard smoke detectors and bases: Analogue Addressable and Conventional.

4.7 Heat Detectors

The heat detectors shall be capable of detecting rapid rise in temperature and/or fixed absolute temperatures.

The heat detectors shall employ two heat-sensing elements with different thermal characteristics to provide a rate of rise dependent response.

The detector should also incorporate a locking mechanism, so that the detector can only be removed with a special removal tool.

The heat detectors shall include RFI screening to minimise the effect of radiated and conducted electrical interference.

The manufacturer shall have available the following versions of heat detectors to meet different applications:

- Analogue addressable – Class P
- Conventional Fixed Temp./Rate of Rise – Class A and Class C
- Conventional – Intrinsically Safe – Grade 1

The heat detectors shall incorporate two LEDs, clearly visible from the outside, to provide an indication of alarm actuation.

In locations where the detector is not readily visible, remote indicator units shall be provided.

4.8 Detector Base

The automatic point-type fire detectors shall be fixed to the installation by means of screw-fit bases. The three types of bases specified above shall incorporate the optional feature of being able to lock the detectors in place once plugged in. Termination facilities shall be available for earthing. Standard conventional and Analogue Addressable bases shall not contain any electronic circuitry. This shall enable insulation and continuity checks to be completed on the wiring with the detector heads removed.

Standard Analogue Addressable bases should be capable of supporting sensors, beacons, remote indicators, sounders and sounder/beacons without the need to physically change base types.

5 Other Devices

5.1 Addressable Manual Call Points

The addressable manual call points shall monitor and signal to the FACP the status of a switch operated by a “non-frangible element” assembly. They shall be red in colour and suitable for surface or flush mounting. The addressable call points shall be provided with an integral red LED to indicate activation.

One version of the addressable call point shall be available mounted in a weatherproof housing, affording protection to IP66.

The addressable call points shall be capable of operating by means of thumb pressure and not require a hammer. They shall be capable of being tested using a special ‘key’ and feature a non-frangible, resettable element instead of a glass.

The addressable call points shall incorporate a mechanism to interrupt the normal addressable loop scan to provide an alarm response within 3 seconds and shall be field programmable to trigger either an alert or an evacuate response from the FACP.

The unit should also be available as an integral SCI (short-circuit isolator) variant, both for internal and external use.

5.2 Addressable Loop Powered Beacon

The addressable Beacon is a visual indicating device with a flash rate of 1 Hz.

The Beacon should also incorporate a locking mechanism, so that the device can only be removed with a special removal tool.

5.3 Addressable Sounder Module

The addressable sounder module shall be capable of monitoring and controlling one or more circuits of alarm sounders using a single loop address.

24 Vdc power to drive the sounders shall be derived independently from the FACP.

The addressable sounder module shall be capable of operating sounders in a pulsing or continuous mode as determined on the module. If the unit has more than one sounder circuit, these shall be individually programmable and capable of synchronisation.

The addressable sounder module shall provide the facility to monitor the wiring to the sounders for open or short-circuit and transmit the necessary fault signal to the FACP. Each sounder circuit shall be separately fused.

The addressable sounder module shall provide the facility to monitor for failure of the power supply for the sounders and transmit the necessary fault signal to FACP.

The addressable sounder module shall provide a visible indication when the FACP is polling it.

5.4 Conventional Detector Interface Module

The conventional detector interface module shall be capable of monitoring two independent zones, each of up to 30 conventional detectors using a single loop address.

24 Vdc power to power the conventional detectors shall be derived independently from the FACP. The conventional detector interface module shall provide the facility to monitor the detector zones for open or short-circuit and transmit the necessary fault signal to the FACP.

The conventional detector interface module shall provide two remote LEDs to indicate which zones are in alarm and shall provide a red LED to indicate FACP polling. The unit should also support Schottky Diode head removal.

5.5 Addressable Relay Controller Module

The addressable relay interface module shall be capable of switching two independent relays; either normally open or normally closed, each rated at 30 V, 1 Amp.

A single input shall provide open and short circuit monitoring facilities, set locally at the unit.

The addressable relay interface module shall use a single loop address.

The unit shall be powered directly from the addressable loop.

The addressable relay interface module shall provide an LED indication when the FACP is polling it.

5.6 Addressable Mains Relay Controller Module

The addressable mains relay controller module shall be capable of switching one relay; either normally open or normally closed, rated at 250V AC, 5 Amps.

A single input shall provide open and short circuit monitoring facilities, set locally at the unit.

The addressable mains relay controller module shall use a single loop address.

The unit shall be powered directly from the addressable loop.

The addressable mains relay controller module shall provide an LED indication when the FACP is polling it.

5.7 Addressable Input Monitoring Module

The addressable switch monitoring module shall be capable of monitoring one or two independent voltage free contacts, each normally open or normally closed, using a single loop address.

The unit shall be powered directly from the addressable loop.

The addressable switch-monitoring module shall provide an LED indication when the FACP is polling it. The LED shall be continuously lit when an input is active.

5.8 Short Circuit Isolator Base

The short circuit isolator base shall provide protection on the addressable loop by automatically disconnecting the section of wiring between two isolators where a short circuit has occurred.

The short circuit isolator base shall derive its power directly from the addressable loop.

Any Sensor or Beacon can be fitted to the isolator base; the isolator base is also ceiling or wall mountable.

5.9 Loop Powered Sounder Beacon Base

Addressable electronic sounder beacon bases shall be connected directly to the detection loops. These shall be able to be mounted onto a standard sensor mounting base.

An analogue smoke sensor, multi-sensor, heat sensor, addressable beacon or an addressable remote indicator may also be mounted onto the sounder beacon base, if required. The sounder beacon base shall be ceiling or wall mountable. A cover plate shall be fitted when no other device is to be fitted on the sounder beacon base.

The loop-powered sounder beacon base volume and tone shall be determined at the FACP. The loop powered sounder beacon base shall be programmable to have a sound output variable between 50 dB(A) and 98 dB(A) (± 2 dB(A)) at 1 metre distance. The beacon should employ LED technology to reduce current consumption and maintenance.

The sounder and beacon within the device should have the capability to be operated separately or together, this should be selected at the FACP.

Where recommended by the risk assessment, an EN54-23 compliant variant should be available for certain environments.

5.10 Loop Powered Sounder Base

Addressable electronic sounder bases shall be connected directly to the detection loops. These shall be able to be mounted onto a standard or short circuit isolator sensor mounting base.

An analogue smoke sensor, multi-sensor, heat sensor, addressable beacon or an addressable remote indicator may also be mounted onto the sounder base, if required. The sounder base shall be ceiling or wall mountable. A cover plate shall be fitted when no other device is to be fitted on the sounder base.

The loop-powered sounder base volume and tone shall be determined at the FACP. The loop powered sounder base shall be programmable to have a sound output variable between 50 dB(A) and 98 dB(A) (± 2 dB(A)) at 1 metre distance.

5.11 Loop Powered Wall Sounder

The Loop Powered Wall Sounder shall be connected directly to the loops where required. The unit shall be fixed onto a sounder specific mounting base which will be red to match the sounder. A weatherproof kit should be available to increase the IP Rating of the wall sounder to IP66.

The Wall Sounder sound output should be variable between 90 dB(A) and 102 dB(A).

5.12 Loop Powered Wall Sounder Beacon

The Loop Powered Wall Sounder Beacon shall be connected directly to the loops where required. The unit shall be fixed onto a sounder specific mounting base which will be red to match the sounder. A weatherproof kit should be available to increase the IP Rating of the wall sounder to IP66.

The beacon should utilise LED technology to reduce current consumption and maintenance. The Wall Sounder Beacon sound output should be variable between 90 dB(A) and 102 dB(A) The sounder and beacon within the device should have the capability to be operated separately or together, this should be selected at the FACP.

Where recommended by the risk assessment, an EN54-23 compliant variant should be available for certain environments.

5.13 EN54-23 Compliant Loop Powered Wall Beacon

The loop-powered wall beacon should contain a free-form optic designed to produce a highly visible flash which should meet the cubic light volume coverage requirements of EN54-23. The flash frequency should be 0.5/1 Hz. The unit should fit directly onto the standard sensor mounting base and be available with either red or white LEDs.

5.14 EN54-23 Compliant Loop Powered Ceiling Beacon

The loop-powered ceiling beacon should contain a free-form optic designed to produce a highly visible flash which should meet the cylindrical light volume coverage requirements of EN54-23. The flash frequency should be 0.5/1 Hz. The unit should fit directly onto the standard sensor mounting base and be available with either red or white LEDs.

5.15 Photoelectric Beam Smoke Detectors

The photoelectric beam smoke detectors shall be capable of detecting visible combustion gases emanating from fires and shall utilise the light obscuration principle. The emitter shall project a near infra-red beam to the receiver.

Two types are acceptable:

- The photoelectric beam smoke detectors shall consist of an emitter and a receiver pair. The detectors shall operate over a 5 – 100 metre range providing a maximum coverage of 1500m².
- A Photoelectric reflective beam smoke detector consisting of a combined control unit and a separate reflector. The detector shall operate over a 5 – 30 metre range providing a maximum coverage of 450m².

The photoelectric beam smoke detectors shall have automatic recalibration in order to adjust for contamination.

The photoelectric beam smoke detectors shall be designed to have high resistance to corrosion and shall include RFI screening to minimise the effect of radiated and conducted electrical interference. The photoelectric beam smoke detectors shall incorporate two LEDs, clearly visible from the outside and below, to provide indication of alarm actuation and fault.

5.16 Infra-Red Flame Detectors

The flame detector shall be of a point-type. It shall be mounted on its base using a simple twist action for ease of installation and removal. The flame detector should feature twin fire LEDs.

The flame detector shall be able to detect infra-red rays in a 120° cone of vision, in a direct line of sight.

6 Sounders

Two types of Electronic sounders shall be acceptable: loop-powered addressable sounders (see above) and stand-alone versions. Stand-alone versions shall be powered by 24 V DC from the FACP. Non loop-powered versions shall be surface mountable with a back box available in indoor or outdoor IP ratings. They shall have a minimum sound output of 95 dB(A) at 1 metre distance and shall have a maximum current consumption at 24 V DC of 100 mA.

7 Wireless Fire Detection

The wired to wireless fire detection system shall be connected directly to the FACP loop using a loop-powered translation module. The field devices should use bi-directional radio waves to communicate with the translation module, which should in turn communicate with the FACP allowing full control and monitoring of the wireless field devices. The radio signal shall be self-optimising both in amplitude and frequency. An automatic channel hopping facility should be included. The system shall be expandable via the addition of expansion modules which shall boost the radio signals to the translation modules. Field units shall utilise standard, low-cost lithium battery technology and, in accordance to EN54-25, contain two batteries – a primary and a secondary (back-up).

7.1 Wired To Wireless Translation Module

The translation module should allow a wireless fire detection system to be interfaced directly onto the loop, with a total of 6 being permitted per loop. It should be loop-powered and be able to support up to 32 wireless devices.

7.2 Wireless Input Module

The wireless input module shall allow the on/off status (alarm/fault) of an external device to be transmitted to the FACP wirelessly via a wireless translation module.

7.3 Wireless Output Module

The wireless output module shall allow the control panel to activate/switch the circuits of an external device wirelessly via a wireless translation module.

7.4 Wireless Manual Call Points

The wireless resettable manual call point shall feature a 'non-frangible' window element which when activated results in a plastic 'flag' being displayed in the window of the unit. A supplied key will reset the flag and unit. There should be a weatherproof version available for exterior use.

7.5 Wireless Sensors

The wireless sensor range should consist of a photoelectric smoke sensor, a rate of rise heat sensor and a multi-criteria sensor (smoke and heat). Each sensor shall feature a polling/activation LED. The sensors should be EN54 compliant. Sensors should be supplied with their own mounting bases.

7.6 Wireless Wall Sounders

The wireless wall sounder range should consist of an internal wall sounder, an external (IP66) wall sounder, a wall sounder beacon and an external (IP66) wall sounder beacon. The sound output of these devices shall range between a minimum of 6 dB(A) and a maximum of 100 dB(A). The wall sounder beacons shall provide a flash rate/light output of 1 Hz / 1 Cd.

7.7 Wireless Base Sounders

The wireless base sounder range should consist of a base sounder (audio) and a base sounder beacon (audio visual). Both models in the range shall provide a maximum sound output of 90 dB(A). The base sounder beacon shall also provide a flash rate of 1 Hz. The bases shall provide a fixing for any wireless sensor. The bases shall provide a fixing for a cover plate when a sensor is not utilised.

7.8 Wireless Beacon

The wireless beacon shall provide two flash rates of 0.5 Hz or 1 Hz with a red lens.