Smart Connect Multiloop
Addressable Fire Alarm System

Architectural Specification Document

CONTENTS

1 SCOPE OF WORK

1a To design, supply and install a Modular Addressable (24Vdc) EN54-2 & EN54-4 certified Fire Alarm Control System.

1b The Smart Connect Multiloop system is totally modular which enables it to satisfy any size building fire alarm needs. (utilising MKII addressable devices) in accordance with the details specified within this document.

1c The Smart Connect Multiloop Fire Alarm Control Panels (FACP) shall be powerful and intelligent, incorporating a 32-bit microcontroller (MCU) forming the heart of Velocity.

1d The Smart Connect Multiloop FACP shall be able to provide pinpoint detection locations when configuring the system to meet the output mapping requirements of the building.

1e The multifunctional Smart Connect Multiloop FACP shall interrogate the receiving signals from various types of fire sensors and initiate audible and visual operating information. The FACP shall rapidly process logical decisions based on the status of the fire sensors and other initiating devices to control the system outputs.

1f The Smart Connect FACP shall perform full system tests and maintenance, providing commissioning functions via comprehensive on-board installation programming and diagnostic tools.

1g The Windows based software configuration tool Connect is used to configure the system's operation based on the customer specified operating requirements, reducing commissioning and installation times.

2 STANDARDS AND REGULATIONS

2.1 Where applicable, the FACP shall comply fully with the following British Standards and/or other nominated rules and regulations. The equipment manufacturer shall confirm compliance with the standards.

2.2 The equipment manufacturer shall be approved to BS EN ISO 9001 quality system standard for the design and manufacture of the equipment.

2.3 The FACP shall be designed to comply with the current edition of the IET Wiring regulations (BS 7671).

2.4 The FACP shall be designed to comply with BS 5839-1, Fire detection and alarm systems for buildings: Code of practice for system design, installation and maintenance.

2.5 The FACP shall be designed to comply with the following parts of BS EN54 Fire detection and fire alarm systems:

2.5.1 BS EN54-2: Control and indicating equipment.

2.5.2 BS EN54-4: Power supply equipment.

2.6 The FACP shall be certified as being compliant with EN54 Parts 2&4 by the independent test house BRE Global Loss Prevention Certification Board (LPCB).

3 VELOCITY MMP FIRE ALARM CONTROL PANELS

3.1 Key Features

3.1.1 The addressable FACP(s) shall be:
- Modular in system construction
- Flexible
- Multi-functional
- Multi-configurable
- Networkable

3.1.2 Standard Fire Panels - The FACP(s) shall be supplied in 3 standard models
- SMART6 Port Panel - accommodates up to 6 internal panel modules
- SMART10 Port Panel - accommodates up to 10 internal panel modules
- SMART26 Port Panel - accommodates up to 26 internal panel modules

3.1.3 A selection of 9 Internal Panel Modules -The FACP(s) shall accommodate and communicate with internal panel modules, up to the quantity of ports specified within the panel product description.
example – Panel Description : SMART6 Port Panel - this panel has 6 available ports, accommodating up to 6 modules.
- The quantity and configuration of the modules is completely flexible.
  (9 available internal panels modules – refer to section 3.8 Internal Panel Modules)

3.1.4 250 Device Detection Loop – Each loop module shall support up to 254 addressable loop devices using the Velocity protocol and can be in any combination (Detectors, MCPs, Loop Interface Modules).
- 450mA current – Each loop SLC shall be capable of providing 450mA current & to maintain a minimum of 24 volts on the loop up to the full extent of the battery standby period.
- Compatible - with all detectors and loop modules listed (refer to sections 3.9 Detection Devices, 3.10 Manual Call Points, 3.11 Addressable Loop Modules).
- Addressing – via an 8 way dip switch or using a hand-held programming device, in the event device changes post installation, the loop address ID's are all independent and non-sequence critical.
- Wiring Installation - Each loop shall be 2 wire Class - A (circuit starting at and returning to the same set of terminals on the SLC module) and also have the ability to be wired as Class-X using the short circuit isolator loop modules.

3.1.5 Loop Device Interrogation – The FACP shall interrogate each individual addressable detection device and provide alarm indication within 3 seconds from a manual call point and 10 seconds for all other devices.

3.1.6 254 Programmable Zones

3.1.7 TCP/IP Connectivity – The FACP shall have the ability to provide an interfacing connection into a Local Area Network (LAN) to allow remote monitoring via a PC graphics system.

3.1.8 Networking & Remote Annunciator - The FACP shall operate as part of a networked system of up to 64 panels peer-to-peer or as a standalone. When networked the system allows any authorised installer or user to make any required actions / amendments to the system from any panel on the network, this also includes the SMART/REP repeater panel.

3.1.9 Full System Redundancy – Each panel has 2 built in microprocessors, the secondary microprocessor is there as back-up, this will take over if required ensuring the basic functions of the FACP are maintained.

3.1.10 8032 Events Log - The FACP shall have an event log which has the capability of storing up to the last 8032 events. These events can be reset at engineer level.

- Date and Time - on-board real-time clock and date referencing facility running in conjunction with the events log. The user has the option to change the clock and date settings if required.

3.1.11 Cause and Effect programming - The FACP shall have full Cause and Effect programming from the front of the panel or the SMART Connect PC software. This functionality will allow isolation of a group of selected detectors in an area(s) of a building prior to any maintenance work being carried out.
Other cause and effect features:

- Shall allow extensive day/night mode programming.

3.1.12 Conventional System capability - The FACP shall have the ability to accommodate conventional detection devices by utilising the Zone monitor modules. The FACP has the flexibility to be an analogue addressable panel, a combination of both addressable and conventional or just as a conventional panel.

3.1.13 Printer - The FACP shall have an optional internal RS-232 interface module to allow connection to either an on-board printer or to a PC and a printer – (refer to section 3.8.4 RS232 Module)

3.1.14 Touch Screen - The FACP shall incorporate a 4.3" front of panel, colour touch screen LCD display to enable users to access the various built-in functions and interact with the information displayed. For security reasons, the FACP shall require a password code for entry to access level 2 (authorised user) and access level 3 (engineer).

3.1.15 Monitoring & Control - The FACP shall be capable of monitoring and controlling remote site devices, such as relays for the control of auxiliary equipment such as Lifts, ventilation systems etc.

3.1.16 Alarm Verification Sequence – The FACP shall have the ability annunciate an alert or pre-alarm condition designed to give the earliest possible warning of a potential fire evacuation condition with causing an unwanted false alarm.

- Retard Time - Up to 30 seconds to verify pre-alarm
- Period Time – Up to 60 seconds to await secondary verification.

3.1.17 Automatic Drift Compensation – The FACP shall have as standard, automatic drift compensation to prevent false trigger alarms due to detector head contamination, signalling a warning when the compensation limit has been reached.

3.1.18 Periodic System Testing – The FACP shall be have the ability to initiate full audible and visual warning output test in accordance with BS5839 and or local regulations.

3.1.19 Power Supply – The FACP shall have a 30Vdc integral approved power supply – (refer to section 3.18 Power Supply Specification)

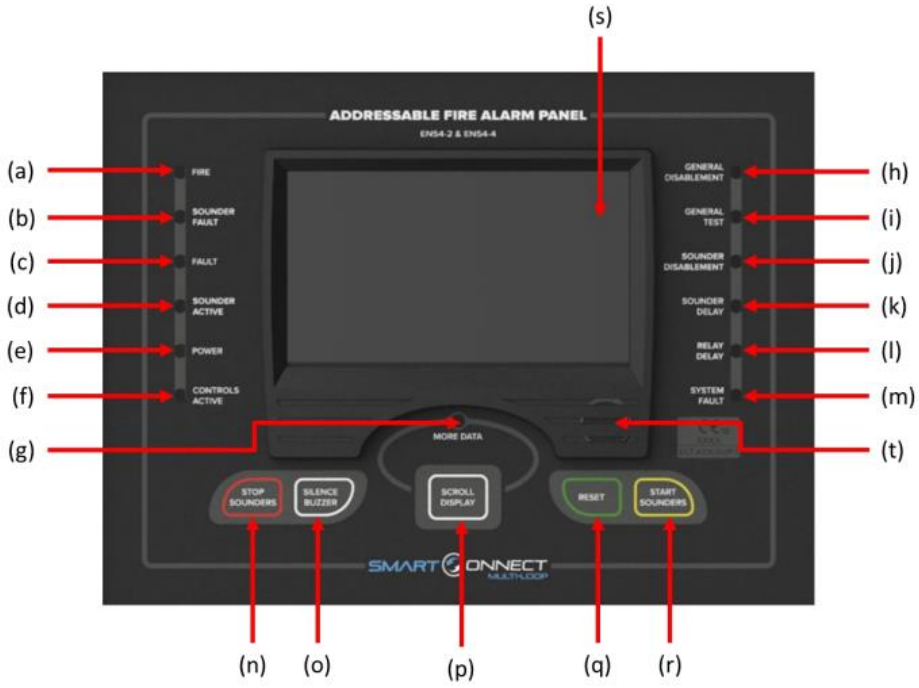
3.2 Fire Alarm Panel Indications

3.2.1 Status Reporting - The FACP shall continuously monitor and report the status of all addressable devices programmed on any of the installed loops for the following:
• Fire • Double address • Short circuit fault • Open circuit fault • Pre-alarm condition
• Detector head contamination • Unauthorised removal or exchange a device.

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

3.2.3 The FACP shall provide the following LED indication as a minimum
Figure #1 below shows the control buttons, LED indicators and switch locations

Figure #1



3.2.4 A – LED: FIRE

- Red LED.
- On steady when there is an active alarm event present.
- Off when the alarm condition is cleared, and when the panel has been reset.

3.2.5 B – LED: Sounder Fault

- Yellow LED
- Flashes when there is a fault on either a sounder circuit, or a sounder device.
- Off when the sounder fault has been cleared and the panel has been reset.

3.2.6 C - Fault

- Yellow LED
- Flashes when there is a fault with a monitored circuit or system component when a circuit is disabled or when the panel is in an off-normal condition.
- On steady once event buzzer has been silenced.
- Off when the fault condition has been cleared
  (some fault signals may require a system reset if they are latched).

3.2.7 D – LED: Sounder Active

- Yellow LED
- On steady when the output of any sounder circuit or sounder device is currently active.
- Off when there are no sounder circuits or sounder devices active.

3.2.8 E – LED: Power

- Green LED
- On steady when the panel has power.
- Off when the panel has no source of power applied.

3.2.9 F – LED Controls Active

- Yellow LED
- Indicates the user now has access to use either the function buttons or the LCD touchscreen display (depending on access level).
- On when the user has entered the access level 2 user password, or when the user has entered the access level 3 engineers password.
- Off when either the access has timed out, or when the user/engineer has locked the panel.

3.2.10 G – LED: More Data

- Yellow LED
- Flashes when there is more event data supressed on the LCD screen.
- On steady when all current events have been accepted and the buzzer is silenced.
- Off when there are no events.

3.2.11 H – LED: General Disablement

- Yellow LED
- On steady when any part of the system has been disabled.
- Off when there are no current disablements.

3.2.12 I – LED: General Test

- Yellow LED
- On steady when any part of the system is in test mode.
- Off when there are no current circuits/devices in test mode.

3.2.13 J – LED: Sounder Disablement.

- Yellow LED
- On steady when any sounder circuit or sounder device has been disabled.
- Off when the sounder circuits and sounder devices are in normal condition.

3.2.14 K – LED: Sounder Delay.

- Yellow LED
- On when a sounder circuit or sounder device has been configured to delay its output.
- Off when there is no configured delay to a sounder circuit or a sounder device's output.

3.2.15 L – LED: Relay Delay.

- Yellow LED
- On when the relay circuit or relay device has been configured to delay it's output.
- Off when there is no configured delay to a relay circuit or a relay device's output.

3.2.16 M – LED System Fault.

- Yellow LED
- On when there is an abnormal microprocessor running condition due to various unexpected phenomena.
- Off when the microprocessor is running correctly.

3.3 Touch Screen LCD Display

3.3.1 In addition to the forementioned LED indications detailed in section 3.2.1, the FACP shall also have an integral 4.3" full colour resistive touch screen LCD.

The touch screen LCD shall provide detailed information and display system status for the following conditions:

- Normal conditions
- Fault Condition
- Alarm Condition
- Supervisory Condition
- Disablement Condition
- Test Condition
- Multiple Conditions:

  Priority: Alarms > Supervisory > Fault > Disablement/Test
- Alarm Verification Conditions
- 3 Access levels: Passcode Required

  1. Basic User access 2. Full User access 2. Engineer access

3.4 Additional Control Buttons

3.4.1 The FACP shall incorporate as a minimum requirement the following pushbutton controls. Figure #1 below shows the control buttons (page 5)

N – Function Button: Stop Sounders

- A minimum of Level 2 access (By entering the user password) is required.
- When the STOP SOUNDERS key is pressed, the panel's sounder circuits and sounder devices will be silenced.
- The Alarm Silenced LED will start flashing and remain until either the panel is reset, or until another alarm retriggers the alarm circuits/sounders. The RED FIRE LED shall be maintained.
- NOTE: to silence the panels' internal buzzer, press the silence buzzer button when viewing the event screens.
- It also sends a 'STOP SOUNDERS' message to the printers and history log.

O – Function Button: Stop Sounders

- A minimum of Level 2 access (By entering the user password) is required.
- When the SILENCE BUZZER button is pressed, the control panel will silence its internal sounder (buzzer).
- The silence buzzer message is sent to the printer and the history log.
- The button is used to acknowledge and silence the internal buzzer for Alarm, Tech. Alarm and Fault events.

P – Function Button: Scroll Display (scroll acknowledgement display)

- If there is an event waiting to be acknowledged/silenced, then the MORE DATA LED will be lit.
- Press the scroll display button to view each current Alarm, Technical Alarm and Fault event on the panel.
- The priority will be (Alarm, Technical Alarm, and then Fault).

Q – Function Button: Reset

- A minimum of Level 2 access (By entering the user password) is required.
- Pressing the RESET button will return the panel to normal operating mode, clear any off-normal condition from the status display; restore the alarm and fault relays to their normal state; extinguish all status LEDs except the green POWER LED, and yellow test/disablement/delay LED's.
- If any alarm or fault still exists after you press the SYSTEM RESET button, all sounder circuits, control outputs, and panel audio and visual indicators will reactivate.
- The reset message is sent to the printer and the event log.

R – Function Button: Start Sounders

- A minimum of Level 2 access (By entering the user password) is required.
- To start the panel sounders, press the START SOUNDERS button.
- Using the START SOUNDERS button will manually activate all silenceable outputs and sounder circuits.
- It will not activate the alarm relays.
- It creates a history log entry of the start sounders and also sends it to installed printers.
- The start sounders can be cancelled via a press of the STOP SOUNDERS button. Any programmed cause & effects will override the start sounders operation if the panel receives an alarm event.

T - Internal Buzzer

- Gives an audible indication if there is an alarm, Fault, or supervisory event.
- Audible distinction between alarm and fault provided.

3.5 General User Functions

3.5.1 The FACP shall provide Basic User access (Access level 2a)

3.5.2 The FACP shall incorporate the following Basic User functions, as a minimum:

- Allow the user to have access to the main control panel buttons
- Allow the user to silence the alarms
- Allow the user to acknowledge events
- Allow the user to reset the panel

3.6 Authorised User Functions

3.6.1 The FACP shall provide Full User Access (Access Level 2b) via a password code, or key, to restrict entry to access level 2a functions (for an authorised user).

3.6.2 The FACP shall incorporate the following authorised user functions, as a minimum:

All functions as listed in section 3.5.2

- Set the time and date
- Print/display/reset event log functions
- Disable/enable detection zones
- Disable/enable fire sounders
- Disable/enable outputs
- Disable/enable relays
- Disable/enable devices
- Disable/enable fault relay
- Disable/enable output delays.

3.7 Engineer Functions

3.7.1 The FACP shall provide a password code to restrict entry to Engineer Access (level 3a - for an engineer).

3.7.2 The FACP shall incorporate the following engineer functions, as a minimum:

All disablements as listed in section 3.6.2

Disable/enable earth faults

Set up passwords

Connect to PC

Network functions

Perform a loop learn

Find new devices

Display fitted devices

Assign zone/group

Calibrate devices

Commission loops

Display calibration problems

Display duplicate addresses

Set day/night times

Perform a clean start

Monitor a point

Test device outputs

Test output sets

Test sounder groups

Test panel relays

Put detection zone(s) into walk-test mode

Blink detector LEDs

Intensive device monitor

Perform a loop test

Display the database

Display the panel's software version and checksum

Display status of the panel's PSU and standby battery

Display loop current.

3.8 Internal Panel Modules

3.8.1 The FACP shall provide the ability to operate, control and monitor the system by means of interchangeable modules.

3.8.2 The FACP shall not limit any configuration or quantity of the internal panel modules, providing a bespoke central processing unit for the system suitable for its requirements

3.8.3 The FACP shall have the ability to incorporate any of the below listed internal panel modules onto internally mounted din rails by means of a plug and play system.

3.8.4 Available Internal Panel Modules - Designed to meet EN requirements.
Quick and easy to install by plugging the RJ45 cable into the module and control panel (cable supplied with unit).

SmartConnect Loop Card Module

Provides power for & handles communications to the analogue addressable devices. The SLC continuously monitors the analogue values of all devices & displays this value on the control panel as a percentage of the alarm threshold value

- Certified to EN54 Part 2 requirements.
- Supports up to 250 addresses.
- 450mA max load (20 ohms loop resistance)
- Supports Class X & Class A wiring configurations.
- "Heartbeat LED" that shows communication between the module & motherboard.
- Extensive front unit status indications.
- Time saving AUTO-LEARN facility.
- Double address detection

SmartConnect Alarm Circuit Module

Provides power for and handles communications to the non addressable notification appliances. It has two notification appliance circuits' with up to a maximum of 500mA can be connected to each circuit.
Each circuit is supervised for open, short and earth fault conditions and will report this status back
to the Smart Connect Multiloop fire alarm control panel.

- Certified to EN54 Part 2 requirements.
- Can be configured as an alarm output or a power output.
- 2 x output circuit (500mA max load per circuit).
- Extensive front unit status indications.
- Each circuit can be programmed as a 24v auxiliary (500mA max load per circuit).
- Power Limited

SmartConnect Zone Monitor Module

The module has six conventional zones which can be typically used for conventional devices and/or for special detectors that are not available in addressable form such as UV detectors, aspiration, and beam detectors etc. The module monitors and transmits the status (normal, open, short, or alarm) of a zone with the detectors to a control panel. Each zone input can be programmed to either give an alarm signal or a technical alarm signal when active.

- Certified to EN54 Part 2 requirements.

- 6 x Conventional zones
- Each zone is monitored for open & short circuit.
- Extensive front unit status indications.
- Each zone input can be configured as either Alarm or Technical Alarm

Smart Connect Multi-Input Module

The module has six class B inputs that are commonly used to monitor and raise alarms from any ancillary equipment such as sprinkler flow switches, aspiration detectors, secondary fire control panels, beam detectors, and external power supplies etc.
The module monitors and transmits the status (normal, open, short, or alarm) of inputs to a control panel. Each input can be programmed to either give a supervisory or alarm signal when active.

- Certified to EN54 Part 2 requirements.
- 6 x Class B input circuits.
- Each input is monitored for open & short circuits.
- Extensive front unit status indications.
- Each input can be configured as either Alarm or Supervisory

Smart Connect Multi-Relay Output Module

The module has three form C relays which can be typically used to control lift operation during an alarm, start fire pumps or stop ventilation fans etc.
Each relay output can be configured as a common alarm, common fault, common technical alarm or as a programmable output, controlled via cause and effect programming.

- Certified to EN54 Part 2 requirements.
- 3 x Form C relay outputs.
- Each relay can be programmed to activate on alarm, technical alarm, or fault.
- Extensive front unit status indications.

SmartConnect RS-485 Network Module

Has the facility to monitor, indicate and control the functions of a fire alarm installation, thus allowing signals to be distributed around a large site. The network uses RS485 data communication and a total network cable length of up to 10km is possible.

All panels will continue to function in stand-alone mode, even if the network fails.
On a Smart Connect Multiloop running in a network, all events are reported at all panels and all panels are able to remotely program other Smart Connect Multiloop panels sitting on the network.
Operation of outputs over the network is determined by the programmed cause & effects.

- Certified to EN54 Part 2 requirements.
- Peer-to-peer networking.
- Comprehensive cross network cause & effects.
- Up to 64 panels may be networked together.
- Remote programming over the network.

- The network can be configured with either a ring or bus topology fault tolerant design.

- Extensive front unit status indications.

SmartConnect RS-232 Interface Module

Gives a SmartConnect Multiloop panel the ability to interface to RS232 serial equipment and devices. This is most commonly used to connect the SmartConnect Multiloop to an RS232 panel printer, or a desktop printer for real time event log printing.
The module also has a 5V aux output that is used to provide power to the panel's internal printer.

- Certified to EN54 Part 2 requirements.
- Use to interface to RS232 devices.
- 5V aux output (for use with panel printer only).
- Extensive front unit indications

SmartConnect TCP/IP Module

The Local area network module provides a Smart Connect Multiloop Panel with a TCP/ IP connection that allows the panel to report events to an external monitoring system, such as Datalog or Zeta Remote.

- Certified to EN54 Part 2 requirements
- TCP/IP output via RJ45
- Remote monitoring via a desktop PC or smartphone via the cloud.
- Remote control via the cloud
- Responsive web interface
- "Heartbeat LED" that shows communication between the module & motherboard.
- Extensive front unit status indications.

SmartConnect Gas Detection Module

The SCM-4-20 Module is optimised for connecting Zeta`s range of 4-20mA detectors. These have a stepped output and the module has preset options for each detector. It also has a custom setting that is fully adjustable so can be configured for any detector.

- Each SCM-4-20 module has 2 available circuits.
- Each circuit will allow a single connection of a 4-20mA device
- Extensive front unit status indications.
- Compatible with any Smart Connect Multiloop Panel

3.9 Detection Devices (General)

3.9.1 Detectors shall comply with or type certified to EN54.7 & EN54.17

3.9.2 Detectors shall be designed to connect to a 24vdc supply with an operating range of 20 vdc to 38vdc peak

3.9.3 Detector shall have 5 response modes which cover a range of sensitivities as well as response times. The mode for each individual detector shall be set via the FACP during the polling cycle. The response mode of any detector maybe changed from the control panel at any time.

3.9.4 The Detectors shall be intelligent and addressable devices and shall connect with two wires to the FACU's Loop Card Module.

3.9.5 Up to 250 detectors shall be connected to a single loop.

3.9.6 The Detectors shall operate on a digital Frequency Shift Key (FSK) protocol loop to give reduced power consumption.

3.9.7 The Detectors shall have a self-test function to send a fault signal to the FACU when any fault occurred on the device.

3.9.8 The Detectors shall be ceiling-mounted using a twist-lock type fitting base. There shall be a locking grub-screw on the base to ensure they cannot be removed without the appropriate tool.

3.9.9 Functional Bases or retrofit sandwich sounder shall be available where required.

3.9.10 The Detectors shall be Soft addressed using a handheld Programming tool, which reduces the possibility of installation error, or via dip switch on the field devices.

3.9.11 Each detector head shall occupy any one of 250 possible addresses on the SLC loop.

3.9.12 The Detectors shall provide an 360° visibility with 8 LEDs, illuminated by Red and Green LED's, so it may be seen from any angle. This will allow the detector base to be installed in any orientation.

3.9.13 The 8 LEDs shall indicate device Alarm status in steady Red and also indicate in flashing Green that the Detector is operational and in regular communication with the FACU.

3.9.14 If required, the flashing mode operation of the Detector LED's shall be controlled to turn off through the FACU configuration.

3.9.15 An output connection shall also be provided in the base to connect an external remote alarm LED.

Addressable Smoke Detector:

3.9.16 Smoke Detectors shall use the photoelectric (light-scattering) principle to measure smoke density and shall, on command from the FACU, send data to the panel digitally representing the analogue level of smoke density.

3.9.17 The Detector sensitivity shall be set through the FACU configuration.

3.9.18 Sensitivity shall be automatically adjusted by the panel on a time-of-day basis.

3.9.19 The Detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance.

3.9.20 Smoke Detectors shall have a chemically etched, stainless steel insect screen to prevent ingress of insects and airborne contaminants, which may cause false alarms.

Addressable Heat Detector:

3.9.21 Heat Detectors shall use a thermistor element to measure thermal conditions caused by a fire and shall, on command from the FACU, send data to the panel representing the analogue or digital level (the temperature) at the detector.

3.9.22 The Detectors shall be a combination rate-of-rise and 57 °C fixed temperature heat detector, in order to react quickly in the event of a fire situation or for high temperature applications, the Detectors shall be 90 °C fixed temperature heat detector.

3.9.23 The combination heat detector shall initiate an alarm when either the rate of ambient temperature increase exceeds an 8.3 °C per a minute or the ambient temperature reaches up to a 57 °C (135 °F) fixed temperature.

3.9.24 The fixed temperature heat detectors for high temperature application shall initiate an alarm when the ambient temperature reaches up to a 83 °C (181 °F) fixed temperature.

3.9.25 The high temperature heat detector shall be used only for the installation where the maximum expected ambient ceiling temperature exceeds 47 °C.

Addressable Smoke and Heat Detector:

3.9.26 The Detector shall be comprised of two sensing elements, including a photoelectric (light-scattering) smoke sensor and a thermistor heat sensor.

3.9.27 The Detector shall be able to indicate distinct smoke and heat alarms.

3.9.28 The Detector shall include the ability via the FACU's configuration to combine the signal of the photoelectric signal with the heat sensing element in order to react quickly in the event of a fire situation. It shall also include the inherent ability to distinguish between a fire condition and a nuisance alarm condition.

3.9.29 Smoke detection portion shall be able to measure smoke density and shall, on command from the FACU, send data to the panel digitally representing the analogue level of smoke density.

3.9.30 The smoke sensitivity shall be set through the FACU configuration, and shall be automatically adjusted by the panel on a time-of-day basis.

3.9.31 The smoke detection portion shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance.

3.9.32 The smoke detection portion shall have a chemically etched, stainless steel insect screen to prevent ingress of insects and airborne contaminants, which may cause false alarms.

3.9.33 Heat detection portion shall, on command from the FACU, send data to the panel representing the analogue or digital level (the temperature) at the detector.

3.9.34 The heat detection portion shall be a combination rate-of-rise and fixed temperature heat detector, in order to react quickly in the event of a fire situation.

3.9.35 The heat detection portion shall initiate an alarm when either the rate of ambient temperature increase exceeds an 8.3 °C per a minute or the ambient temperature reaches up to a 57 °C fixed temperature.

Addressable Sounder Base

3.9.36 The Sounder Base shall be listed to EN54.3

3.9.37 The addressable base sounder shall provide a standard output of 85dB(A) at 1 metre and shall have a low current consumption at this level.

3.9.38 The addressable base sounder shall be supplied as a sounder base only, so that a detector can be fitted.

3.9.39 The addressable base sounder shall produce up to a choice of 16 tones on command from the FACP. The addressable base sounder shall be capable of deriving its power directly from the addressable loop.

3.9.40 The unique soft address of the device shall be set by the installer by means of a hand-held programmer OR from the FACP.

3.10 Manual Call Points (MCP)

Manual Call Point

3.10.1 The Manual Call Points shall be addressable and be certified to EN54.11 & EN54.17

3.10.2 The MCP housing shall be a red plastic molding and shall have dimensions not exceeding 88mm (W) x 87mm (H) x 61mm (D).

3.10.3 The MCP should be either a Single action manual call points shall be activated by depressing the frangible element marked with an "Arrow & Dot with Hand" operating logo.

Or otherwise a double action manual call points shall be activated by firstly lifting the integral clear protective cover and then by depressing the frangible element marked with an "Arrow & Dot with Hand" operating logo.

3.10.4 MCPs shall contain electronic circuits similar to those in detection equipment, so that the communication protocol and fast response to the alarm state of the device are monitored. The MCP housing and electronic circuits shall be supplied by the manufacturer of the detection and interface modules.

3.10.5 Communication between MCPs and the FACP shall be provided by a digital protocol on 2-wires as used to supply DC power to the MCP.

3.10.6 Communication from the MCP to the FACP shall be in the form of digital response superimposed on the DC supply. All circuits used in data communication shall be designed and manufactured by the original manufacturer and shall be a complete and integral part of the MCP.

3.10.7 A red Alarm LED shall be provided and visible on the front face of the MCP. The LED should be controlled by the FACP, independent of the device

3.10.8 The MCPs are required to be able to flash their LEDs each time they are polled.

3.10.9 MCPs shall operate within the following environmental parameters:

- Temperature range (no condensation or icing): –20°C to +60°C
- Humidity (no condensation): 0% to 95%RH

3.10.10 The manual call point shall require a "Reset Key" to restore the frangible element. The "Reset Key" shall be accessible to controlled person(s) only

3.11 Addressable Loop Modules

General Requirements:

3.11.1 The Loop Modules shall be intelligent and addressable devices and shall connect with two wires to the FACP Signal Line Circuit (SLC) loop.

3.11.2 Up to 60 Loop Modules shall be connected to a single loop.

3.11.3 The Loop Modules shall operate on a digital Frequency Shift Key (FSK) protocol loop to give reduced power consumption.

3.11.4 The Loop Modules shall be soft addressed by the installer by means of a hand-held programmer or hand addressed using the 8 way dip switch.

3.11.5 Each loop module shall occupy any one of 250 possible addresses on the loop.

3.11.6 The Loop Modules shall provide three coloured status indicators, illuminated by Red, Yellow and Green LED's.

3.11.7 If required, the flashing mode operation of the Loop Module LED's shall be controlled to turn off through the FACU configuration.

Addressable Zone Monitor Module with Isolator

3.11.8 The Zone Monitor Module shall be certified to EN54.17 & EN54.18

3.11.9 The Zone Monitor Modules shall be provided to interface one supervised input circuit of Conventional Detectors and manual call points to the loop card module and contain an integral short circuit isolator.

3.11.10 A range of Conventional devices, including MCP's shall be available.

3.11.11 The zone monitor module shall provide the facility to monitor the input wiring for open-circuit and short-circuit faults and transmit the necessary fault signal to the FACP.

3.11.12 The zone monitor module shall provide the facility to use 'active end-of-line devices' and diode bases for detector head removal monitoring. The zone monitor shall communicate three input states to the FACP: 'Normal', 'Fault' and 'Alarm'.

3.11.13 The zone monitor module shall provide a red LED indication for an 'Alarm' condition and shall latch in the 'Alarm' condition.

3.11.14 The zone monitor module shall provide the facility to power and control intrinsically safe detectors and manual call points via a safety barrier.

3.11.15 The zone monitor module shall be capable of being loop powered directly from the addressable loop.

3.11.16 The soft address of the module shall be set by the installer by means of a hand-held programmer or hand addressed using the 8 way dip switch

Addressable Input Module with Isolator

3.11.17 Input Module certified to EN54.17 & EN54.18

3.11.18 The input module provides a single input switch trigger via an alarm output of the monitored device.

3.11.19 Interface modules shall contain an integral short circuit isolator.

3.11.20 The contacts of the input/output module shall be rated at a minimum of 1A@30Vdc.

3.11.21 The input module shall take its operating power from the addressable loop.

3.11.22 The input module shall provide a steady red LED indication that the relay has operated.

3.11.23 The input module shall provide flashing green LED indication for a communication check with the panel.

3.11.24 The input module shall provide a yellow LED to indicate a 'Fault' condition; open circuit and short circuit on the input wiring.

3.11.25 The input module shall provide monitoring of the status of a single pole, volt-free contact connected on a single pair of cables, to the FACP.

3.11.26 The input module shall communicate three input states to the FACP: 'Normal', 'Fault' and 'Switch Closed'.

3.11.27 The soft address of the module shall be set by the installer by means of a hand-held programmer or hand addressed using the 8 way dip switch

Addressable Input/Output Module with Isolator

3.11.28 Input/Output Module certified to EN54.17 & EN54.18

3.11.29 The input/output module provides a single pole volt-free changeover relay contact operated by command from the FACP.

3.11.30 Interface modules shall contain an integral short circuit isolator.

3.11.31 The contacts of the input/output module shall be rated at a minimum of 1A@30Vdc.

3.11.32 The input/output module shall take its operating power from the addressable loop.

3.11.33 The input/output module shall provide a steady red LED indication that the relay has operated.

3.11.34 The input/output module shall provide flashing green LED indication for a communication check with the panel.

3.11.35 The input/output module shall provide a yellow LED to indicate a 'Fault' condition; open circuit and short circuit on the input wiring.

3.11.36 The input/output module shall provide monitoring of the status of a single pole, volt-free contact connected on a single pair of cables, to the FACP.

3.11.37 The input/output module shall communicate three input states to the FACP: 'Normal', 'Fault' and 'Switch Closed'.

3.11.38 The soft address of the module shall be set by the installer by means of a hand-held programmer or hand addressed using the 8 way dip switch

Addressable Input/Output Module (mains switching) with Isolator

3.11.39 Input/Output Module certified to EN54.17 & EN54.18

3.11.40 The input/output module provides a single pole volt-free changeover relay contact operated by command from the FACP.

3.11.41 Interface modules shall contain an integral short circuit isolator.

3.11.42 The contacts of the input/output module shall be rated at a minimum of 5A@230Vac and 5A@30Vdc.

3.11.43 The input/output module shall take its operating power from the addressable loop.

3.11.44 The input/output module shall provide a steady red LED indication that the relay has operated.

3.11.45 The input/output module shall provide flashing green LED indication for a communication check with the panel.

3.11.46 The input/output module shall provide a yellow LED to indicate a 'Fault' condition; open circuit and short circuit on the input wiring.

3.11.47 The input/output module shall provide monitoring of the status of a single pole, volt-free contact connected on a single pair of cables, to the FACP.

3.11.48 The input/output module shall communicate three input states to the FACP: 'Normal', 'Fault' and 'Switch Closed'.

3.11.49 The soft address of the module shall be set by the installer by means of a hand-held programmer or hand addressed using the 8 way dip switch

Addressable Mini Input Module

3.11.50 The Mini Input Module shall be available in a miniature package. This input module is designed to provide an addressable output when installed with conventional MCP, conventional beam detectors etc…

3.11.51 The Mini Input Module is powered from the loop

3.11.52 The address of the module shall be set by the installer by means of a hard addressed using the 8 way dip switch

Addressable Sounder Control Module

3.11.53 Addressable Sounder Control Modules shall provide supervised control and operation of one conventional alarm indicating circuit of compatible, 16 to 30 VDC powered, polarized audio/visual indicating devices.

3.11.54 Audio/visual power shall be provided by a separate supervised power circuit from the FACU or from a supervised, certified remote power supply.

3.11.55 The Sounder Control Module shall monitor for the presence of the external power.

3.11.56 The indicating circuit of the Module shall be capable of powering a maximum of 500mA of resistive audio-visual signalling equipment.

3.11.57 The indicating circuit shall be able to be wired for Class B operation.

3.12 Sounders

3.12.1 The FACP shall support both addressable (loop powered) and conventional sounder circuits

3.12.2 The addressable loop powered / controlled sounders shall be line monitored for open-circuit and short circuit faults.

3.12.3 The maximum number of loop powered sounders per loop @5.4mA shall be up to 90

3.12.4 The number of programmable sounder groups shall be 16.

3.12.5 The FACP shall provide the necessary outputs to operate two independently programmable conventional sounder circuits. The maximum number of conventional sounders @10mA shall be up to 49 sounders for a one circuit.

3.12.6 The conventional sounder circuits shall have an EOL allowing line monitoring for open-circuit and short-circuit faults.

3.12.7 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.

3.12.8 The FACP shall have the facility to change, on a per sounder zone basis, the sound output dependent upon whether the source of alarm is an automatic detector, e.g. smoke or heat, or a manual call point.

3.13 Alarm Monitoring

3.13.1 The FACP shall have the ability to interrogate every addressable loop device.

3.13.2 The FACP shall have the ability to monitor for 'FIRE' and 'FAULT'

3.13.4 The FACP shall have the ability to display the analogue levels returned from the sensors.

3.13.5 The FACP shall have the ability to provide automatic warning that a detector has reached a level of contamination that requires it be replaced or serviced.

3.14 Auxiliary Inputs

3.14.1 The FACP shall have provision to increase the number of programmable inputs using the Multi Input Module(s)

3.15 Auxiliary Outputs

3.15.1 The FACP shall provide as a minimum the following auxiliary outputs:

1 x Fault output

1 x Alarm output

3.15.2 The FACP shall have provision to increase the number of programmable Outputs using the Multi Rely Module(s)

3.16 Fault Reporting

3.16.1 The FACP shall monitor and report faults all critical system components. When a fault occurs on a critical part of the fire alarm system, the FACP shall respond by activating its internal sounder, illuminating the General Fault LED and other LEDs relating to the fault.

3.16.2 The FACP fault output shall also be activated (providing it has not been disabled). The active fault shall also be displayed on the LCD and provide text messages to indicate the precise location of where a fault has occurred in the system.

3.16.3 The following faults shall be reported in the manner described in sections 3.16.1 and 3.16.2:

- Loop integrity fault
- Detector head removal
- Unconfigured device

- Device missing
- Addressable device failure
- PSU fault
- Battery fault
- Mains failure
- Mains fuse ruptured
- Battery fuse ruptured
- Sounder wiring open-circuit
- Sounder wiring short-circuit
- Microprocessor fault
- Main control PCB fault
- Earth fault.

3.17 Wiring

3.17.1 All wiring shall be installed in accordance with the current edition of BS 5839-1 and BS 7671 (IEE Wiring Regulations), and/or other relevant national standards.

3.17.2 Connector blocks shall accept cables up to 1.5mm^2.

3.17.3 The maximum allowable loop impedance (each conductor) shall be 20Ω.

3.17.4 Cables shall be fire-resistant screened cable, minimum size 1mm^2.

3.17.5 Cable lengths shall be a maximum of 1Km per loop.

3.18 Power Supply Specification

3.18.1 The FACP shall operate on mains supply voltage of:

Mains AC Supply Voltage: 230/120Va.c.
Mains AC Supply Frequency: 47-63 Hz
Power Supply DC Rating: 30Vdc 400W

3.18.2 AC power shall be monitored by the control panel, there shall be an automatic transfer of power to the back-up power source if AC voltage levels drop below the minimum required for the panel operate effectively.

Standby Power

3.18.3 Battery backup shall be used to provide 24VDC standby power if required.

3.18.4 The batteries shall be sealed lead-acid

3.18.5 The required battery output shall be calculated specific to the systems requirements

3.18.6 The on-board battery charger shall have the ability to provide full recharge of the required batteries in accordance to EN requirements

3.18.7 The FACP shall monitor the battery charger and report Fault if the batteries are no longer being charged or if they have been disconnected.

3.19 Panel Construction

3.19.1 The housing containing the fire alarm panel shall be made of Zintec Steel

3.19.2 Steel thickness variation dependent on panel model

- SMART6 & Repeater - Back box & front door are 0.9mm
- SMART10 & SMART26 – Back box & front door are 1.5mm
- All other internal parts for all panels are 0.9mm

3.19.3 The paint colour for the back box & front door RAL9005 Black Leatherette

3.19.4 The paint colour for all internals is RAL9005 Black Leatherette.

3.19.5 The FACP shall be capable of being semi-surface or surface mount with various cable knockouts: 34 x SMART6
38 x SMART10
112 x SMART26
5x Repeater

3.19.5 Panel dimensions and weight shall be:

- SMART6 – 535mm H x 385mm W x 150mm D WGT: 9kg
- SMART10 – 665mm H x 535mm W x 200mm D WGT: 15kg
- SMART26 – 665mm H x 975mm W x 200mm D WGT: 27kg
- Repeater – 230mm H x 340mm W x 96mm D WGT: 2.3kg

3.19.4 All enclosures shall have a minimum ingress protection to IP30 and will require a tool key to open the front door.

4. System Networking

4.1 The SMART MULTILOOP networking protocol can be used to connect up to 64 FACPs / Repeaters of any configuration in one loop.

4.2. The SMART Multiloop Repeater shall offer the same controls and functions of the FACPs.

4.2 Networking Key Features

4.2.1 The SMART Multiloop system network has the facility to monitor, indicate and control the functions of a fire alarm installation from any node, thus allowing signals to be distributed around a large site.

4.2.2 On a SMART Multiloop running in a network, all events are reported at all panels and all panels are able to remotely program other SMART Multiloop panels sitting on the network. Operation of outputs over the network is determined by the programmed cause & effects.

4.2.3 True peer to peer

4.2.4 The connection between FACPs / Remote Annunciators shall be with 2 core (screen) cable, RS485 network and wired either as:

- Ring Network (Class A)
  In a ring network, each control panel is connected to 2 other control panels to form a ring. This has the same topology as the loops of addressable devices connected to each CIE. This has the advantage that no panels are lost if there is a single break in the network.

- Bus Network (Class B) This is similar to a ring network but wired panel to panel without a return connection from last panel to first panel. It could also be referred to as a radial or spur network.

4.2.5 The FACP network shall be capable of being wired up to 1KM of cable

4.2.6 Running the Network
All events are reported at all panels.
Accept fire & faults from any FACP / Repeater
All panels are able to silence & reset the system from any FACP / Repeater
Accept disablement commands: for zones, sounders & output from other FACPs / Repeater
Operation of outputs over the network is determined by the programmed cause & effect.
The cause & effect is entered at the panel that has the INPUT CAUSE connected.
Any input on the network can be programmed to operate any output.
Monitor for network wiring faults.

4.2.7 Fires detected on remote FACPs shall be displayed on all FACPs / Repeaters, including the point description of the alarms origin.

4.2.8 Faults detected on remote FACPs shall be displayed on all FACPs / Repeaters, including the point description of detectors.

4.2.9 The network shall support the programming of site data into remote FACPs from a PC connected at a local FACP.

5. Programming Tools

5.1 The FACP shall be capable of being programmed either on-board using the Touch Screen LCD or interfacing with a PC using a SMART Connect PC Software Windows-based program for programming purposes and configuration updates.

5.2 The programming PC shall connect to the main FACP via a USB connection.

5.3 The FACP shall have the facility to allow the connection to an on-board printer or external printer using the RS-232 interface module for printing the panel's event log.

6. Key Documents

6.1 The manufacturer shall provide a complete set of documents describing the FACP setup.

6.2 The following documentation shall be provided by the manufacturer, as a minimum:

Installation Manual

Operation and Maintenance Manual

6.3 Other system information can be made available upon request, for example the SMART Connect Multiloop "Loop Calculator" to help calculate power consumption.