4100ES Series Fire Alarm Panel

GUIDE SPECIFICATION

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Contents

NOTE: Items shown in brackets [ ] indicate choices to be made for a specific project.

Part 1 - GENERAL

1.1 SCOPE & RELATED DOCUMENTS

The work covered by this section of the specifications includes the furnishing of all labour, equipment, materials, and performance of all operations associated with the installation of the Fire Alarm Control Panel (FACP) as shown on the drawings and as herein specified.

The requirements of the conditions of the Contract, Supplementary Conditions, and General Requirements apply to the work specified in this section.

The complete installation shall conform to AS1670.1 and AS1668.1, AS/ACIF S009:2001 and Local Code Requirements.

The work covered by this section of the specifications shall be co-ordinated with the related work as specified elsewhere under the project specifications.

1.2 QUALITY ASSURANCE

Each and all items of the FACP shall be listed as a product of a SINGLE fire alarm system manufacturer under the appropriate category by ActivFire. Control Panels shall be assembled and tested in a facility that is accredited to ISO9001.

1.3 GENERAL

Furnish and install a complete Fire Alarm System as described herein and as shown on the plans; to be wired, connected, and left in first class operating condition. Include sufficient control panel(s), annunciator(s), manual call points, automatic fire detectors, smoke detectors, alarm indicating appliances, wiring, terminations, electrical boxes, and all other necessary material for a complete operating system.

The FACP shall be a Simplex 4100ES system or similar approved product and allow for:

Manufacturer support for forwards compatible technology shall be available to ensure new developments and the latest system spare parts can be incorporated into the fire alarm system throughout the life of the building.

Loading and editing special instructions and operating sequences as required. The system shall be capable of on-site programming to accommodate system expansion and facilitate changes in operation.

All software operations shall be stored in a non-volatile programmable memory within the fire alarm control panel, this includes up to 9 older versions of software loaded into the fire alarm panel so they can be recalled for comparison at any time.

Manuals for the FACP and specific site data such as site installations drawings are to be stored in the fire alarm panel memory card and accessible by fire service companies as required. Loss of primary and secondary power shall not erase any of the information stored in memory.

This system shall be capable of storing dual configuration programs with one active and one in reserve. The panel shall be capable of full system operation during a new configuration download.

Software downloading is to be done by way of direct Ethernet port connection.

Full flexibility for selective input/output control functions based on Boolean operators: AND, OR, NOT, timers, counters and special coded operations shall also be incorporated in the resident software programming of the system.

The system shall have the capability of storing and recalling alarms and fault conditions in chronological order for the purpose of recreating an event history. Uploading of the historical logs is to be done by way of direct Ethernet port connection.

The FACP shall have the capability of uploading service reports of the installed devices, report upload is to be done via direct Ethernet port connection.

The FACP shall have the capability of activating an “install” mode, to reduce the number of system faults shown on the Fire Panel display during commissioning.

Remote panel site-specific software and executive firmware downloads shall be capable of being performed over the fire alarm network communications and via TCP/IP Ethernet network communications. Ethernet access to any fire alarm panel shall be capable of providing access only to authenticated users.

The Fire Alarm Control Panel (FACP) shall have the capability to provide supplemental notification and remote user or service provider access using Ethernet and TCP/IP communications protocol.

The fire panel internet interface shall be capable of sending automated notification of discrete system events via email and SMS text messaging to 50 individual user accounts and via email to 5 distribution lists.

All panels and peripheral devices shall be the standard product of a quality manufacturer and shall display the manufacturer's name on each component. The catalogue numbers specified under this section are those of Simplex and constitute the type, product quality, material, and desired operating features.

If equipment of another manufacturer is submitted for approval, the contractor shall state how much is to be deducted from the base bid for the substitution, and also shall state what, if any, specific points of system operation differ from the specified points of the system operation. This differentiation report must reference every paragraph of this specification.

1.4 OPERATION

1.4.1 The FACP alarm operation subsequent to the alarm activation of any manual call point, automatic detection device, sprinkler pressure switch or sprinkler flow switch shall be as follows:

Audible warning signals shall sound continuously until the Warning System Isolate Switch is operated or the system is reset.

On an alarm, all doors normally held open by door control devices shall release.

A signal to notify the local fire brigade shall be activated.

The mechanical controls shall activate the air handling systems in accordancee with AS1668.1.

1.4.2 The FACP shall provide "on/off/auto" switches to manually control the fans in accordance with AS1668.1.

In the automatic mode, the mechanical controls shall operate the air handling systems as required normally.

The FACP shall indicate "running" or "stopped" status of the air handling system via separate and distinct "run" and "stop" LED indicators.

Positive feedback inputs shall be provided to indicate true "run" and "stop" status from designated contact closures in the air handling system. This positive feedback indication shall take precedence in determining true "running/stopped" status.

NOTE TO ENGINEER:

PROVISIONS MUST BE MADE FOR NORMALLY OPEN CONTACTS IN THE AIR HANDLING SYSTEM (E.G. SAIL SWITCHES, PRESSURE DIFFERENTIAL SWITCHES) TO BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR AND WIRED BY THE ELECTRICAL CONTRACTOR.

FAN RUNNING SENSING VIA CURRENT TRANSFORMERS, ESPECIALLY WHEN USED WITH VARIABLE SPEED DRIVES, HAVE SHOWN TO GIVE UNRELIABLE SIGNALS AND ARE NOT RECOMMENDED.

1.4.3 Upon reset of the FACP, air handling trip signals shall remain in "fire mode" until reset via the "A/C Reset" control on the fire alarm control panel.

1.4.4 Alarms shall be displayed by a red LED indicator per zone.

Zone isolated conditions shall be displayed by a yellow LED indicator per zone.

Zone isolate and de-isolate control shall be by a switch per zone.

The zone indicators and switch shall be physically grouped together with a descriptive label designating the zone location. Zone indication and control shall be modular and provide for eight (8) zones per module.

1.4.5 Additional alarm information shall be displayed on an 80 character LCD display. The top line of 40 characters shall be the point label and second line shall be the device type identifier. The system alarm LED shall flash on the control panel until the alarm has been acknowledged. Once acknowledged, this same LED shall latch on. A subsequent alarm received from another zone shall flash the system alarm LED on the control panel. The LCD display shall show the new alarm information.

1.4.6 A pulsing alarm tone shall occur within the control panel until the event has been acknowledged.

1.4.7 The activation of any system smoke detector shall initiate an Alarm Verification operation whereby the panel shall reset the activated detector and wait for a second alarm activation. If, within three (3) minutes after resetting, a second alarm is reported from the same or any other smoke or thermal detector, the system shall process the alarm as described previously. If no second alarm occurs within three minutes, the system shall resume normal operation. The Alarm Verification shall operate only on smoke detector alarms. The alarm verification operation shall be selectable by conventional detection circuit or addressable detector.

The FACP shall have the capability to display the number of times (tally) a conventional zone or addressable detector has gone into a verification mode. Should this alarm verification tally reach a pre-programmed number, a fault condition shall occur.

Alarm verification zones shall be able to be divided into eight separate groups whereby only verification zones from the same group shall confirm the first activation and cause the alarm sequence to occur.

1.4.8 The activation of any alarm zone or ancillary control isolation switches shall activate the audible signal and illuminate the Isolate LED on the control panel. Pressing the Isolate Acknowledge Key shall silence the isolate audible signal while maintaining the Isolate LED "on" indicating the abnormal condition. Restoring the isolate switch to the normal position shall cause the Isolate LED to extinguish, indicating restoration to normal.

1.4.9 The actuation of the "enable walk test" program at the FACP shall activate the "Walk Test" mode of the system which shall cause the following to occur:

The fire brigade alarm shall be bypassed.

Control relay functions shall be bypassed.

The control panel shall show a fault condition.

The alarm activation of any initiation device shall cause [the audible signals to activate for two seconds and] the circuit/device to be displayed on the 80 character LCD.

The panel shall automatically reset itself after signaling is complete.

Any momentary opening of an alarm circuit shall cause the audible signals to sound for 4 seconds indicating a fault condition.

The FACP shall have the capacity of 8 distinctive walk test groups, such that only a portion of the system need be disabled during testing.

1.4.10 Install Mode: The FACP shall have provide the capability to group all non-commissioned points and devices into a single "Install Mode" trouble condition allowing an operator to more clearly identify event activations from commissioned points and devices and in occupied areas.

It shall be possible to individually remove points from Install Mode as required for phased system commissioning.

It shall be possible to retrieve an Install Mode report listing that includes a list of all points assigned to the Install Mode. Panels not having an install mode shall be reprogrammed to remove any non-commissioned points and devices.

1.5 SUPERVISION

1.5.1 The FACP [and graphics computer] shall contain independently supervised alarm zone facilities. The alarm activation of any alarm zone facility shall not prevent the subsequent alarm operation of any other alarm zone facility.

1.5.2 There shall be independently supervised ancillary control facilities for alarm [horns] [bells] [strobes]. Fault conditions of any circuit shall not affect the operation of other circuits.

1.5.3 Each independently supervised circuit shall include a description that is displayed on the LCD to indicate fault conditions per circuit.

1.5.4 The incoming power to the system shall be supervised so that any power failure is audibly and visually indicated at the control panel. A green "power on" LED shall be displayed continuously while incoming power is present.

1.5.5 The FACP batteries shall be supervised so that a fault battery condition or disconnection of the battery is audibly indicated at the control panel and displayed on the LCD.

1.5.6 The FACP Modules shall be electrically supervised for connection. Should a module become disconnected the system fault indicator shall illuminate and the audible fault signal shall sound and the module description shall be displayed on the LCD.

1.5.7 The FACP [and graphics computer] shall have provisions for isolating and de-isolating all circuits individually for maintenance or testing purposes.

1.5.8 Wiring to a hardwired (non-serial) remote annunciator shall be supervised for open, short and ground conditions. A separate annunciator indicator must be provided. It shall illuminate and an audible fault signal shall sound at the FACP upon the detection of a fault condition.

1.6 POWER REQUIREMENTS

1.6.1 The control panel shall receive 240 VAC power via a dedicated circuit.

1.6.2 The FACP shall be provided with sufficient battery capacity to operate the entire system upon loss of normal 240 VAC power in a normal supervisory mode for a period of twenty-four (24) hours when brigade connected with thirty (30) minutes of alarm operation at the end of this period. Batteries are to be de-rated as per AS1670.1 .The system shall automatically transfer to the standby batteries upon power failure. All battery charging and recharging operations shall be automatic.

1.6.3 All external circuits requiring system operating power shall be 24VDC and shall be individually fused or power limited at the control panel.

Part 2 - PRODUCT

2.1 FIRE ALARM CONTROL PANEL (FACP)

2.1.1 FACP construction shall be Simplex 4100ES or similar approved and be modular with solid state, microprocessor based electronics. All modules shall be easily installed or replaced using basic hand tools.

The system proposed shall be capable of supporting conventional, addressable and analogue devices so that potential future expansion and enhancement may be achieved with ease.

A local audible device shall sound for Alarm, Fault or Isolate conditions. This audible device shall sound differently during each condition to distinguish one condition from another without having to view the panel. An audible device shall also sound during each key press to provide an audible feedback to ensure that the key has been pressed properly.

2.1.2 The following primary controls shall be visible through a front access panel:

Individual alarm LED per zone

Individual isolate LED per zone

Individual isolate/de-isolate switch per zone

Eighty (80) character liquid crystal display

Common red system alarm LED

Common yellow isolate LED

Common yellow fault LED

Green "power on" LED

Alarm Acknowledge key

Isolate Acknowledge key

Fault Acknowledge key

System Reset key

2.1.3 The following secondary control switches and LEDs shall be available:

Alarm Test

Fault Test

Battery Test

A/C Reset

Ancillary Controls Isolate

Warning System Isolate

2.1.4 The control panel shall provide the following:

Setting of time and date

LED testing

Activation and deactivation of each control point separately

Changing operator access levels

Walk Test enable

Running diagnostic functions

Displaying software revision level

Displaying historical logs

Displaying card status

2.1.5 For maintenance purposes, the following lists shall be available from the point lists menu:

All points list by address

Alarm zone point list

Ancillary control list

Auxiliary control list

Feedback point list

Pseudo point list

Install mode list

Scrolling through menu options or lists shall be accomplished in a self-directing manner in which prompting messages shall direct the user. These controls shall be located behind an access door.

2.1.6 LCD Display.

The FACP shall have a 2 line x 40 character liquid crystal display which shall be backlit for enhanced readability. So as to conserve battery standby power, it shall not be lit during an AC power failure unless an alarm condition occurs or there is keypad activity.

The display shall support both upper and lower case letters. Lower-case letters shall be used for soft key titles and prompting the user. Upper-case letters shall be used for System Status Information. A cursor shall be visible when entering information.

2.2 SYSTEM FRONT PANEL OPERATION AND CAPABILITIES

2.2.1 Under normal condition the front panel shall display a "System is Normal" message and the current time and date.

2.2.2 Should an abnormal condition be detected, the appropriate LED (Alarm, Isolate or Fault) shall flash. The panel audible signal shall pulse for alarm conditions and sound steady for fault and isolated conditions.

2.2.3 The LCD shall display the following information about the abnormal condition of a point in the system:

- 40 character custom location label
- Type of device (i.e. smoke, heat, water flow)
- Point status (i.e. alarm, fault)

2.2.4 Pressing the appropriate acknowledge button shall globally acknowledge every point in the list.

2.2.5 After all points have been acknowledged, the LEDs shall glow steady and the audible device shall be silenced. The total number of alarms, isolates and fault conditions shall be displayed along with a prompt to review each list chronologically. The end of the list shall be indicated by an end of list message "END OF LIST".

2.2.6 The SYSTEM RESET button shall be used to return the system to its normal state after an alarm condition has been remedied. Messages, "SYSTEM RESET IN PROGRESS", shall be displayed first followed by the message "SYSTEM RESET COMPLETED", and finally, "SYSTEM IS NORMAL", should all alarm conditions be cleared.

Should an alarm condition continue to exist, the message "SYSTEM RESET IN PROGRESS" shall be followed by the message "SYSTEM RESET ABORTED" and the system shall remain in an abnormal state. System control relays shall not reset. The audible device and Alarm LED shall be on. The display shall indicate the total number of alarms and faults present in the system along with a prompt to use the ACK keys to review the points. These points shall not require acknowledgment if they were previously acknowledged.

2.2.7 Additional function keys shall be provided to access status data for the following points:

- Alarm zone facilities

- Ancillary control facilities
- Auxiliary relays
- Feedback points
- All other input/output points

The following status data shall be available:

- Primary State of point
- Zone and Card type information
- Disable/Enable status
- Verification tallies of initiating devices
- Automatic/Manual Control Status of output points
- Acknowledge status
- Relay status

2.2.8 History Logging

The FACP shall be capable of logging and storing 300 events in an alarm log and 300 events in a trouble log. These events shall be stored in a battery protected random access memory and be up-loadable via the panels Ethernet port when required. Each recorded event shall include the time and date of that event's occurrence.

The following Historical Alarm Log events shall be stored:

- Alarms
- Alarm Acknowledgment
- Alarm Silence
- System Reset
- Alarm Historical log cleared

The following Historical Fault Log events shall be stored:

- Fault conditions
- Isolate conditions
- Fault acknowledgment
- Isolation acknowledgment
- Alarm Verification tallies
- Walk Test results
- Alarm Historical log cleared

2.2.9 Silent Walk Test with History Logging

The FACP shall be capable of being tested by one person. While in testing mode, the alarm activation of an alarm circuit shall be silently logged as an alarm condition in the historical data file. The panel shall automatically reset the alarm.

The momentary disconnection of an alarm or ancillary circuit shall be silently logged as a fault condition in the historical data file. The panel shall automatically reset itself after logging the fault condition.

The FACP shall be capable of supporting up to 8 separate testing groups whereby one group of points may be in a testing mode and the other (non-testing) groups may be active and operate as programmed per normal system operation.

After testing is considered complete, testing data may be retrieved from the system in chronological order to ensure device/circuit activation.

Should an alarm condition occur from an active point, not in Walk Test mode, it shall perform operations described in Section 1.4.

2.2.10 LED Supervision

All slave module LEDs shall be supervised for burnout or incorrect connection. Should a problem occur the LCD shall display the module and LED location numbers to facilitate location of that LED.

2.2.11 Access Levels

There shall be four (4) access levels with level 4 being the highest level. Level 1 actions shall not require a passcode. Passcodes shall consist of up to ten (10) digits. Changes to passcodes shall only be made using offline programming software.

In order to maintain security when entering a passcode the digits entered shall not be displayed but a cursor shall move along filling the position with an X to indicate that the digit has been accepted. All key presses shall be acknowledged by a local audible sound.

When a correct passcode is entered, the message "Access Granted" shall be displayed. The new access level shall be in effect until the operator manually logs out or the keypad has been inactive for ten (10) minutes.

Should an invalid code be input, the operator shall be notified with the message "ERROR... INCORRECT PASSCODE" and shall be allowed up to three chances to enter a valid code. After three unsuccessful tries, the message "ACCESS DENIED" shall be displayed. The level shall not be altered, and the operator shall no longer be in the menu option.

Access to a level shall only allow the operator to perform all actions within that level plus all actions of lower levels, not higher levels.

The following keys/switches shall have access levels associated with them:

- Set Time/Date
- On/Off/Auto Control
- Disable/Enable
- Clear Historical Alarm Log
- Clear Historical Fault Log

- Walk Test
- Change Alarm Verification

2.2.12 Equipment Enclosures

Provide cabinets of sufficient size to accommodate the aforementioned equipment. Cabinets shall be equipped with '003' locks and transparent door panels providing freedom from tampering yet allowing full view of the indicators and controls.

2.3 REMOTE ANNUNCIATOR(S)

2.3.1 Repeater Panel

Where shown on the plans provide and install an LED annunciator. The annunciator(s) shall have a beige enamel finish and shall provide on alarm lamp per alarm circuit behind a membrane finish equivalent to a Simplex 4602-9101 SCU panel. The annunciator shall communicate to the control panel over one twisted shielded pair of wire and operating power shall be 24VDC and be fused or power limited at the control panel. Point-wired annunciators will not be considered as equal.

2.3.2 Remote Control Unit

The serial annunciator shall provide a common alarm and fault indication consisting of:

Control pushbutton switches - for alarm silence, fault silence and system reset duplicating the control panel switches. A key "enable" switch shall be provided to activate or deactivate the control switches.

Tone Alert - Duplicates the control panel tone alert during alarm and fault conditions.

System fault LED.

Power on LED.

To accommodate and facilitate job site changes, the control switches shall have the capability to be programmed on site to provide for manual switch input operation other than their standard purpose.

Equivalent to a Simplex 4602-9102 RCU panel.

2.3.3 Graphic Mimic Panel

Where shown on the plans provide and install a graphic display annunciator showing the [site/building] plans. Annunciator LEDs shall show the location of alarm conditions graphically. The graphic annunciator [site/building] plan drawing will be provided by [owner/architect/engineer].

2.3.4 LCD Mimic Panel

Where shown on the plans provide and install an LCD annunciator. The annunciator(s) shall have a beige enamel trim housing covering a membrane keypad complete with the following:

- Two line by 40 character LCD display.
- Control switches for system, acknowledgments, alarm silence and system reset.
- Lamp/LCD test button.
- Backlit display.
- Four programmable control switches.
- Surface or flush mount on a standard 6-gang electrical box.
- Maximum size 300mm wide x 114mm high x 80mm deep.
- A key "Enable" switch shall be provided to activate or de-activate the control switches.
- Tone Alert - to duplicate the control panel tones during Alarm and Fault conditions.
- Led indications for Alarm, Isolate, Fault, Alarm Silence and Power.

The LCD mimic panel shall have the ability to scroll through the list of alarms, faults and isolates as per the FIP, the display shall provide clear English language information.

Information shall be transmitted over one twisted shielded pair of wire and operating power shall be 24VDC and be fused or power limited at the control panel.

2.4 IDNet (addressable loop)

2.4.1 Communication with IDNet devices.

The FACP must provide communication with detectors and monitor control devices individually. All of these devices shall be individually annunciated at the control panel. Annunciation shall include the following conditions for each point:

Alarm: Fault: Open: Short: Device missing/failed

2.4.2 Disable / enable

All addressable devices shall have the capability of being disabled or enabled individually.

2.4.3 Loop capacity

Up to 250 addressable devices may be multi-dropped on a single pair of wires. Systems that require factory reprogramming to add or delete devices are unacceptable.

2.4.4 Format

The communication format must be a completely digital poll/response protocol to allow T-tapping of the circuit wiring. A high degree of communication reliability must be obtained by using parity data bit error checking routines for address codes and check sum routines for the data transmission portion of the protocol. Systems that do not utilize full digital transmission protocol are not acceptable.

2.4.5 Identification of IDNet Devices

Each addressable device must be uniquely identified by an address code entered on each device at time of installation. The use of jumpers to set address will not be acceptable due to the potential of vibration and poor contact. Device identification schemes that do not use uniquely set addresses but rely on electrical position along the communication channel are unacceptable. These systems cannot accommodate T-tapping and the addition of an addressable device between existing devices requires reprogramming all existing electrically further devices. The system must verify that the proper type device is in place and matches the desired software configuration.

2.4.6 Wiring of IDNet Communication Channels

Wiring type will be approved by the consultant and equipment manufacturer and be installed in accordance with the applicable standards.

2.4.7 IDNet + card

Provision shall be made where necessary to include an IDNet+ card. The IDNet + card shall be capable of splitting 1 addressable loop into 4 separate loops. Each loop shall be wired in accordance with the manufactures specifications and be capable of being run over an equivalent distance to that of a standard IDNet loop. The IDNet+ card shall incorporate short circuit isolators for each of the 4 loops and be capable of controlling up to 246 devices over the 4 loops.

2.5 ADDRESSABLE SMOKE SENSORS:

Monitoring: The FACP shall individually monitor sensors for calibration, sensitivity, and alarm condition, and shall individually adjust for sensitivity. The control unit shall determine the condition of each sensor by comparing the sensor value to the stored values.

Environmental Compensation: The FACP shall maintain a moving average of the sensor's smoke chamber value to automatically compensate for dust, dirt, and other conditions that could affect detection operations.

Programmable Sensitivity: Photoelectric Smoke Sensors shall have 7 selectable sensitivity levels programmed and monitored from the FACP.

Sensitivity Testing Reports: The FACP shall provide sensor reports. The reports shall be viewed on a CRT Display or printed for annual recording and logging of the calibration maintenance schedule.

The FACP shall automatically determine when an individual sensor needs cleaning. The system shall provide a means to automatically indicate when a sensor requires cleaning. When a sensor's average value reaches a predetermined value, (3) progressive levels of reporting are to be provided. The first level shall indicate if a sensor is close to a trouble reporting condition and shall be indicated on the FACP as "ALMOST DIRTY." This condition provides a means to alert maintenance staff of a sensor approaching dirty without creating a trouble in the system. If this indicator is ignored and the second level is reached, a "DIRTY SENSOR" condition shall be indicated at the FACP and subsequently a system fault is reported. The sensor base LED shall glow steady giving a visible indication at the sensor location. The "DIRTY SENSOR" condition shall not affect the sensitivity level required to alarm the sensor. If a "DIRTY SENSOR" is left unattended, and its average value increases to a third predetermined value, an "EXCESSIVELY DIRTY SENSOR" trouble condition shall be indicated at the control unit.

The FACP shall continuously perform an automatic self-test on each sensor that will check sensor electronics and ensure the accuracy of the values being transmitted. Any sensor that fails this test shall indicate a "SELF TEST ABNORMAL" trouble condition.

Multi-Sensors: Shall combine photoelectric smoke sensing and heat sensing technologies. An alarm shall be determined by either smoke detection, with selectable sensitivity from 0.65 to 11.6 %/meter obscuration; or heat detection, selectable as fixed temperature or fixed with selectable rate-of-rise; or based on an analysis of the combination of smoke and heat activity.

Programmable bases: It shall be possible to set the base address by way of selectable DIP switches. Each relay and sounder base shall be programmable to operate independently of their associated sensor.

Magnet test activation of smoke sensors shall be distinguished by its label and history log entry as being activated by a magnet.

2.6 DUCT SMOKE SENSORS

Photoelectric type, with sampling tube of design and dimensions as recommended by the manufacturer for the specific duct size and installation conditions where applied.

The detector shall provide on-board sensitivity drift compensation and dirt accumulation tracking.

A magnetic test function shall initiate an alarm and provide detailed diagnostic information using the detector status LED.

The detector shall provide a multi-function status LED indicator that indicates off-normal conditions by specific identifiable detector LED pulse patterns.
The Duct Housing shall provide a supervised relay driver circuit for driving up to 15 relays with a single "Form C" contact rated at 7A@ 28VDC or 10A@ 120VAC or an auxiliary alarm relay with two "Form C" contacts rated at 1A@ 28VDC or ½A@ 120 VAC resistive. This auxiliary relay operates when the detector reaches its alarm threshold. Relay shall be mounted within 1 meter of the HVAC control circuit.

Duct Housing shall provide a relay control trouble indicator Yellow LED.

Compact Duct Housing shall have a transparent cover to monitor for the presence of smoke. Cover shall secure to housing by means of four (4) captive fastening screws.

Duct Housing shall provide two (2) Test Ports for measuring airflow and for testing. These ports shall allow aerosol injection in order to test the activation of the duct smoke detector.

For maintenance purposes, it shall be possible to clean the duct housing sampling tubes by accessing them through the duct housing front cover.

2.7 HEAT SENSORS

Thermal Sensor: Combination fixed-temperature and rate-of-rise unit with plug-in base and alarm indication LED; 57deg C fixed-temperature setting except as indicated.

Thermal sensor shall be of the epoxy encapsulated electronic design. It shall be thermistor-based, rate-compensated, self-restoring and shall not be affected by thermal lag.
The Sensor fixed temperature sensing shall be independent of rate-of-rise sensing and programmable to operate between 56-deg C and 69-deg C.

The Sensor shall have the capability to be programmed as a utility monitoring device to monitor for temperature extremes in the range from 0-deg C to 68-deg C.

2.8 ADDRESSABLE INITAITING MODULES

Addressable Circuit Interface Modules:

Arrange to monitor or control one or more system components that are not otherwise equipped for addressable communication. Modules shall be used for monitoring of waterflow, valve tamper, non-addressable devices, and for control of Air Handling Unit(AHU) systems.
Addressable Circuit Interface Modules shall be capable of mounting in a standard electric outlet box. Modules shall include cover plates to allow surface or flush mounting. Modules shall receive their operating power from the signaling line circuit or a separate two wire pair running from an appropriate power supply, as required.

There shall be the following types of modules available:

Type 1: Monitor Circuit Interface Module:

For conventional 2-wire smoke detector and/or contact device monitoring with wiring supervision. The supervision of the zone wiring shall be by way of an end of line resistive device. This module shall communicate status (normal, alarm, trouble) to the FACP.

Type 2 Line Powered Monitor Circuit Interface Module (IAM)

This type of module is an individually addressable module that has both its power and its communications supplied by the two wire signaling line circuit. It provides location specific addressability to an initiating device by monitoring normally open dry contacts. This module shall have the capability of communicating four zone status conditions (normal, alarm, current limited, trouble) to the FACP. Modules installed in wet areas shall be encapsulated so as to be completely sealed against water ingress

Type 3: Single Address Multi-Point Interface Modules

(6 Point I/O) This multipoint module shall provide location specific addressability for four initiating circuits and control two output relays from a single address. Inputs shall provide supervised monitoring of normally open, dry contacts and be capable of communicating four zone status conditions (normal, open, current limited, and short). The input circuits and output relay operation shall be controlled independently and disabled separately.

(Relay IAM) This dual point module shall provide a supervised multi-state input and a relay output, using a single address. The input shall provide supervised monitoring of two normally open, dry contacts with a single point and be capable of communicating four zone status conditions (normal, open, current limited, and short). The two-wire signaling line circuit shall supply power and communications to the module.

Type 4: Line Powered Control Circuit Interface Module

(relay) This module shall provide control and status tracking of a Form "C" contact. The two-wire signaling line circuit shall supply power and communications to the module.

Type 5: 4-20 mA Analog Monitor Circuit Interface Module

This module shall communicate the status of a compatible 4-20 mA sensor to the FACP. The FACP shall annunciate up to three threshold levels, each with custom action message; display and archive actual sensor analog levels; and permit sensor calibration date recording.

Type 6 Supervised Signal Output Device (Signal ZAM)

This module shall provide control and status tracking of a supervised 24V output signal. Module shall be capable of receiving an external 24V feed to control high current capacity devices or sounders.

All Circuit Interface Modules shall be supervised and uniquely identified by the FACP. Module identification shall be transmitted to the control panel for processing according to the program instructions. Modules shall have an on-board LED to provide an indication that the module is powered and communicating with the FACP. The LEDs shall provide a troubleshooting aid since the LED blinks on poll whenever the peripheral is powered and communicating.

2.9 MANUAL CALL POINTS

Each manual call point shall be addressable and operate independently on the loop. The address shall be set by way of DIP switches located inside the call point cover. The call point shall have a breakable element to enable the transmission of an alarm signal by way of the addressable loop to the fire alarm panel.

2.10 LOOP ISOLATORS

Provision shall be made to include IDNet Loop Isolators at the appropriate point within the loop so a single short or open circuit shall not affect more than 40 devices. These isolators shall be inserted in series with devices on the addressable communication loop and provide bi-directional short circuit isolating protection by disconnecting the section of the communication loop where a short circuit has occurred. The short circuit isolator shall annunciate fault conditions at the control panel and addressable devices on the shorted section of the loop shall be reported at the control panel with "No Answer" status condition. All other devices on the loop shall operate as normal.

The Line Isolator Module shall automatically restore normal communications when the shorted line condition has been corrected.

The Line Isolator Module shall be able to be manually activated by a service technician at the control panel & shall function in conjunction with built-in control panel diagnostics to assist in locating earth fault conditions.

2.11 POWER ISOLATORS

Provision shall be made to include, where necessary, IDNet Power Isolators. These isolators shall be inserted in series with 24 volt powered devices on the addressable communication loop and provide bi-directional short circuit protection by disconnecting the section of the wiring where a short circuit has occurred.

The short circuit condition shall be annunciated at the control panel.

The Power Isolator Module shall automatically restore normal communications when the shorted condition has been corrected.

The Power Isolator Module shall be able to be manually activated by a service technician at the control panel & shall function in conjunction with built-in control panel diagnostics to assist in locating earth fault conditions.

The power isolator shall be used to isolate addressable zone monitor devices to minimize the impact of a short or open on the 24V supply causing the loss of more than 40 devices (which include non-addressable detectors connected to zone monitor devices)

Part 3 – INTERFACE OPTIONS

3.0 FIRE ALARM NETWORK

The Fire Alarm Control Panel shall be capable of operating as a stand alone system with data communication to a higher order Central Processing Unit (Main FIP). The Main FIP shall display all alarms and faults from each Fire Alarm Control Panel.

The system shall be configured for peer to peer control where the remote Fire Alarm Control Panels control themselves and pass monitoring and control data directly to other panels to maximize system functionality in the event of Main FIP failure.

All data communication shall be cabled in accordance with the manufactures specifications and wiring between the CPU and Fire Alarm Control Panel shall be supervised for opens, shorts and grounds. A single open, ground or short on the network communication loop shall not degrade network communications.

Data communications shall be via two paths. Each path shall be cabled with [shielded twisted pair] [multimode optical fiber] [single mode optic fibre]. Systems requiring 4 core network loop cabling will not be accepted.

Data communications shall be directly from panel to panel in a ring configuration. Systems that require a centralized hub or additional equipment to function will not be acceptable.

Data communications shall be capable of being transmitted up to 3000 meters between each fire alarm control panel configured on the network with up to 99 panels connected to a single data loop.

Data communications can be split into several network rings with up to 7 networks being connected to central graphics for site wide control.

The FACP shall support the addition of a building network interface card to enable a secure Ethernet connection to each network panel enabling program downloads to occur through the buildings LAN / WAN.

3.1 TRUESITE WORKSTATION (Colour Graphics)

The TrueSite Workstation shall operate by receiving system events and displaying specified graphic representations of the building(s) and system devices.

The colour graphics shall be a fully functional Network Node communicating on the network. Systems that require connection to a Fire Panel or other intermediate equipment will not be acceptable.

The TrueSite Workstation shall cause a "Fault" condition on other Network Nodes to indicate an off-line condition.

When no alarms or troubles are present, the LCD monitor shall display a graphics screen menu used to access other graphic screens. Each screen shall also display current time and date, system status, and present operator name and access level.

Upon activation of any alarm and on request by the operator, the LCD monitor shall display the floor plan of the floor in alarm with all devices shown. The device in alarm shall flash until acknowledged. The device in alarm shall then become steady until cleared.
If a second alarm is registered prior to the first being cleared, the second shall be identified by flashing, pending alarm indication. Touching the pending alarm area shall transfer the display to the second alarm point graphic screen. All subsequent alarms shall be displayed as indicated above.

Individual point access shall display "real-time" analog sensor temperature, smoke obscuration or module status information.

Capacity shall be provided to annunciate 50,000 network point and/or point lists and historical event logs shall maintain up to 500,000 system events.

Built-in diagnostics shall provide graphical views of the network topology and status. Network communication breaks or inactive nodes shall be clearly indicated as a guide in returning the system to normal.

The TrueSite Workstation shall consist of:

- Personal Computer with detachable keyboard.
- Hard Drive greater than 40 Gigabyte capacity
- [17][21]-inch high-resolution color monitor
- DVD read /write
- Not less than 2 Gigabyte Total RAM
- SVGA Port with not less than 16 Megabyte VRAM
- Microsoft Windows® 7 32-Bit

The LCD monitor shall be touch sensitive or mouse operated and serve as the interactive interface between the operator and the network system. Using the touch screen or mouse the operator shall be able to perform the following tasks:

- Acknowledge all alarm, fault and isolate conditions
- Reset system
- Display list menus

- Select the individual message screens
- Perform manual operation of system(s) control points
- Request the "HELP" menu
- Perform operator login / logout
- Connect (Set Host) to other nodes
- Perform graphic editing functions
- Set the system time and date

The TrueSite Workstation shall have the following editing functions:

- Message Editor - System shall have the capability of on-site adding, changing, deleting or assigning of message screens.
- List Editor - System shall have the capability of on-site editing of customer user lists.
- Graphics Editor - System shall have the capability of on-site editing of graphics screens. Graphics editor shall have the capability of changing background graphics and adding or deleting point symbols. Capacity to create and edit up to 25,000 Graphic Screens.

The TrueSite workstation shall have the capability of operating as a client server arrangement, in that extra client PCs can be added to the main workstation over a LAN or WAN. Up to 10 x client PCs shall be supported with programmable access and control capabilities.

3.2 INTERFACING TO BMS, BACNET or INTERNET

3.2.1 Interface to Building Management Systems.

The FACP shall be capable of reporting alarms, isolations & faults to third party Building Management Systems. Output shall be ASCII from an EIA RS-232-C connection with pre-programmed baud rates. Communications Protocol shall be Simplex Computer Port Protocol format

3.2.2 BACnet Interface.

The FACP shall be capable of interfacing to a building management system supporting BACnet. Interface is to be via Ethernet connection and is to report as a minimum the required alarms, isolations & faults. Fire Alarm Control panel shall recognize up to 1000 BACnet status changes.

3.2.3 Internet Interface.

The FACP shall support connection to the internet via an Ethernet LAN. Interface shall provide single user access for up to 20 different user accounts and shall be compatible with Internet Explorer (version 5.0 or higher) reporting Alarm, Isolation and Fault counts and status messages. Additional information shall be available:

Detailed point information accessible similar to that available at the panel TrueAlarm® sensor status including both status reports and service reports

Alarm and Fault log information

Built-in e-mail feature shall automatically notify user accounts of individually selected status changes:
Information can be alarm, isolation, fault; or TrueAlarm® smoke sensor status of dirty or excessively dirty.

3.2.4 Modbus Interface.

The FACP shall be capable of reporting alarms, isolations & faults to a Modbus interface and shall support up to 10,000 Modbus objects.

3.2.5 Service Gateway:

The FACP shall be capable of running a Service Gateway software application that allows an authorized service person to remotely query panel status during testing, commissioning, and service, using a laptop type PC and mobile phone gateway, without the need to return to the panel.