

TECHNICAL SPECIFICATION

(A) This section of the specification includes the supply, installation, testing, commissioning and handing over of an Analog addressable fire alarm system which is required to form a complete, operative, coordinated system for the Site Address DetailsIt shall include, but not be limited to, Alarm initiating devices, Alarm notification appliances, Control panels, Auxiliary control devices, Annunciation, Power supplies and wiring as specified herein.

(B) The fire alarm system shall generally comply with the requirements of NFPA Standard No. 72 for protected premises signaling systems except as modified and supplemented by this specification. The system shall be supervised either electrically or by software-directed polling of field. The panel, detectors and modules shall preferably be **UL listed**.

GENERAL FIRE ALARM SYSTEM DESCRIPTION

The main FACP shall contain a Microprocessor based Central Processing Unit (CPU). The Panel Shall communicate with and control various field devices used to make up the system, such as smoke, Thermal (heat) and Multi Sensor detectors, Addressable modules, including initiating circuits and notification appliance circuits, local and remote operator terminals, printers, annunciation, and other system controlled devices.

The FACP shall be capable of disabling an individual detector, Facility shall be provided on the FACP for simulating the fire condition to enable testing of the various alarm circuits.

The FACP shall have the facility to silence/ acknowledge/ reset the alarm. Apart from the FACP, Repeater panel present in the control room shall have the facility to silence/ acknowledge the alarm of all FACP's.

In case of a Fire alarm initiation by an alarm initiating device, the audio-visual alarm shall be generated at the respective fire alarm control and the Annunciation/Repeater Panel located in the Control Room, various locations and also initiate signal to operate Sounders located in the various locations.

The FACP shall be programmed for the events to happen in case of fire like closing of fire dampers, shutting down supply fans for HVAC, deactivating the access control system and activating the sounder through a module

The FACP's shall have in built buzzer to alert the personnel in case of maintenance requirement.

The electronic circuit shall be of solid state and of fail-safe design Vermin proof, protected from humidity, corrosion and dust to ensure uninterrupted operation.

The circuit shall be protected against usual electrical transients, electromagnetic and electrostatic interference present in that vicinity.

Spares and shall be made available for a minimum period of 5 years from the date of commissioning of the system.

SLC cable should be placed at-least minimum of one meter away from any High Voltage cable And the routing shall not permit multiple T joints.

The FACP shall have facility to alter access or reset the stored program through a password to avoid unauthorized use.

The system shall have reverse polarity protection, sensitivity adjustment, alert for drift compensation and shall be capable of networking minimum of 8 panels in a system

- 1) The system shall be capable of diagnosing the cabling for open and short circuits, unauthorized removal of detector head and AC failure.
- 2) In case of multiple alarms, the indication shall display in chronological order.

FIRE ALARM CONTROL PANEL (FACP):

The FACPs used in the Building shall confirm with the UL - 9th Editions.

The fire alarm control panel (FACP) shall be suitable for Class-A Style 5, 6 or 7 wiring and Class-B Style 4 type of wiring as per NFPA-72. It shall have provision to accept the range of 110V - 230V \pm 10% single phase, 50 Hz SMPS supply. The processor shall be of M3 32 bit, capability for Day & Night mode. The panel shall maintain 2000 events, each with a time and date stamp. The control panels shall exclusively maintain 1000 alarm event and 1000 other events (troubles supervisory pre alarm etc). The system shall support three password levels, (i.e. Advance / Admin/ user). It shall have inbuilt USB 2.0 Interface for easy configuration facility via PC/Laptop. The FACP shall have Minimum 160 Characters LCD in which the LCD clearly indicates the location of fire, Fault & Supervisory. The FACP should have capacitive Touch Keypad, instead of mechanical snap dome switches for trouble free operation. The panel shall have degraded operating mode. In case of main CPU failure the panel still gives audio and visual notification.

The FACPs shall have maximum capacity of four loops and can be configurable as one, two, three and four loop. It shall have inbuilt RS485 facility for networking. Peer to peer networking of at least eight panels should be possible in a system, comprising of not less than 8128 devices in any combination. The panel shall have two circuits for remote monitoring with at least one for Initiating device circuit. The FACP should have minimum two inbuilt Notification Appliances circuits. The FACP shall have provision to interface Ethernet, GSM module and any BMS. The panel shall have minimum three programmable form C, potential free Relays, loop wise Auto-learn facility for easy installation and commissioning, capability to add or delete the devices without affecting the existing configurations, facility to program 192 groups with label, built in visual alarm indication for minimum 36 zones, programmable time delay facility. The Panel should be capable of alerting duplication of address, mismatch on the device type. The panel shall have provision to restore factory default setting. The FACP should give audio and visual indication for main and/or standby power supply failure. The panel shall indicate degraded power supply in case both the mains and standby power supplies are below the rated level with inbuilt battery charging circuit to charge up to 40Ah SMF batteries. The FACP shall be capable to integrate the voice evacuation system, shall have Programmable Trouble Reminder facility, AC loss Delay facility and also on site and off site programming.

The FACP shall have the following functions activated through the touch key pad:

- Acknowledge
- Silence
- Evacuate
- Reset
- Scroll
- Test

Loop card should have built in intelligence with 32 bit controller, shall be swappable without any configuration changes and should have LED for loop status indication. Each loop shall accommodate minimum 254 devices (detectors and modules) in any combination. All the alarm initiating devices shall be addressed through 8 way DIP switch without any configuration utility/programming kit. (Binary –addressing). All types of detectors offered will be restorable type i.e. suitable for operating afresh after each actuation on alarm without replacement or adjustment. The sensitivity of smoke sensor shall be individually adjusted from the FACP to suit the conditions of each location. Each detector shall have self-test facility, which is monitored in the FACP. The FACP should be able to monitor each detector and raise maintenance alert once the drift compensation level is reached.

CONSTRUCTION DETAILS:

The FACP shall be of 1.6 mm CRCA cabinet and shall have an ingress protection of at least IP – 50. It shall be capable of being wall Mounted or flush mounted. The cabinet and front shall be corrosion protected, given a rust-resistant powder coat, and manufacturer's standard finish. It shall be of Red, White or Black finish as per requirement. The FACP's shall be provided with earthing terminals with cable entry from the top. The panel shall be completely factory wired, absolutely ready-in all respects for installation at site. The internal wiring of the panel shall be carried out with 650V grade, stranded copper wires of size rated for the current in the corresponding circuit. The minimum size of the wire shall be not less than 0.8 sq.mm for electronic-circuits and 1.5sq.mm for electrical circuits & 14AWG for grounding. The door shall be provided with a key lock and shall have the ability to be hinged.

POWER SUPPLY:

The System shall operate in the range of 110-240V AC, 50/60 Hz main supply. The power supply shall have auto resettable fuses. The panel shall have protection against transient and surges. The Power Supply shall be provided with an earth detect circuit, capable of detecting earth faults.

CENTRAL PROCESS UNIT (CPU):

The FACP shall have a processor which shall be 32 bit controller. The sophisticated software shall facilitate extensive memory for storing the logs of alarms, times and action taken report. The memory shall store data in a non-volatile format and retrievable for at least seven years.

REPEATER PANEL (UL LISTED):

The Repeater Panel shall have minimum 160 characters LCD display in which the LCD clearly indicates the location of fire, fault & supervisory status. The repeater panel should have capacitive touch keypad, instead of mechanical snap dome switches, for trouble free operation. Repeater panels shall be suitable for wall mounting or mounting on table which shall display all the parameters occurring on the fire alarm control panel. It shall connect to any of the fire panels in the network. It shall be provided with an external power supply. The repeater panel shall replicate the main panel indications and shall be accessed only by authorized users through password. The

repeater panels shall be connected to the main panel and other repeater panels in such a way that failure in any of the panels shall not affect the performance of the other panels.

ADDRESSABLE DETECTORS

Addressable Multi Sensor (Optical & Thermal) Detector:

The Optical & Thermal (combined) detector shall confirm to the relevant standards having the following features:

1. The detector shall be UL approved.
2. It shall have smoke sensitivity of 1.9 +/- 0.6 %/ft
3. The detector should have fixed temperature rating of 59 deg C and rate of rise of 11.1°C/min
4. The multi detector shall be loop powered and addressed by DIP switches.
5. All the detectors shall have a visible dual blinking LED to indicate the healthiness/ trouble/ alarm condition of the detector. The LED shall be located in such a way that it shall be visible 360°.
6. It shall possess false alarm immunity and a superior signal to noise ratio.
7. It shall be capable of supporting style 7 wiring.
8. It shall have inbuilt drift compensation facility.
9. In case of a failure, panel shall allow to replace the detector with the same type without the need of additional programming.
10. The detector shall change sensitivity settings based on day/night mode or with schedules based on the programming.
11. The detector shall have at least 3 levels of sensitivity settings.

Addressable Optical Smoke Sensor Detector:

The Optical Detector shall confirm to the relevant standards having the following features-

1. Detector shall be UL approved.
2. It shall have smoke sensitivity of 1.9 +/- 0.6 %/ft
3. The Detector shall be loop powered and addressed by DIP switches.
4. All the detectors shall have a visible dual blinking LED to indicate the healthiness/ trouble/ alarm condition of the detector. The LED shall be located in such a way that it shall be visible from the 360°.
5. It shall possess False alarm immunity and a superior signal to noise ratio.
6. It shall be capable of supporting style 7 wiring.
7. It shall have inbuilt drift compensation facility.
8. In case of a failure, panel shall allow to replace the detector with the same type without the need of additional programming.
9. The detector shall change sensitivity settings based on day/night mode or with schedules based on the programming.
10. The detector shall have at least 3 levels of sensitivity settings.

Addressable Heat Detector:

The Heat Detector shall conform to the relevant standards having the following features:

1. Detector shall be UL approved.
2. The detector should have fixed temperature rating of 59 deg C and rate of rise of 11.1 degC/min
3. The Detector shall be loop powered and addressed by DIP switches.
4. All the detectors shall have a visible dual blinking LED to indicate the healthiness/ trouble/ alarm condition of the detector. The LED shall be located in such a way that it shall be visible from the 360°.
5. It shall possess False alarm immunity and a superior signal to noise ratio.
6. It shall be capable of supporting style 7 wiring.
7. In case of a failure, panel shall allow to replace the detector with the same type without the need of additional programming.

Standard base:

1. The base shall be UL Listed
2. The base shall be common for PHOTO, THERMAL AND MULTI SENSOR.
3. Terminals of base shall be rust resistant.
The base shall have separated in and out terminals.
4. The base shall have terminals to connect remote indicator.

ADDRESSABLE MODULES

Control Module (CM):

1. The Control Module shall be UL listed.
2. The CM shall have LED indication to show the status.
3. The CM shall provide a 24V output activating notification devices and 24V DC operated devices.
4. It shall have a capability of handling at least 1A @ 30VDC to integrate with third party system.
5. The CM shall be capable of powering through the auxiliary source and shall supervise the auxiliary power. The CM shall communicate faults and troubles related to the NACs, power supply to the panel.
6. The CM shall be addressed by means of dip switches.
7. The CM shall be loop powered.

Monitor Module (MM):

1. Monitor Module shall be UL Listed.
2. The MM shall have LED indication to show the status.
3. The MM shall have supervised monitoring circuit.
4. The MM shall monitor potential free NO contact.

5. The MM shall be addressed by means of dip switches.
6. The MM shall be loop powered.

Relay Module (RM):

1. The Relay Module shall be UL Listed.
2. The RM shall provide two dry potential free contacts for activating a variety of auxiliary devices and other firefighting / ventilation equipment.
3. The RM shall have contact rating of 2A @30V DC, 0.5 @125 VAC
4. The RM shall be addressed by means of dip switches.
5. The RM shall have LED for status indication.
6. The RM shall be loop powered.

Isolator Module/ Base:

Isolator module/ base shall be part of the loop. These modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC Style 6 (Class A) or Style 4 (Class B branch). The isolator module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit on the SLC loop segment or branch. At least one isolator module shall be provided for each floor or protected zone of the building. If a wire-to-wire short occurs, the isolator module shall automatically open-circuit (disconnect) the SLC. When the short circuit condition is corrected, the isolator module shall automatically reconnect the isolated section. The isolator module shall not require any address setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.

Addressable Zone Interface Module (ZIM):

1. The zone Interface module (ZIM) will facilitate connection of conventional detectors in the same circuit /loop consisting of addressable detectors.
2. The ZIM shall be capable of powering the detectors through the auxiliary source and shall supervise the IDC power supply.
3. The ZIM shall communicate alarm and troubles related to detector and power supply to the Panel.
4. The ZIM shall allow resetting conventional detectors from the panel.
5. The ZIM shall be addresses by means of dip switches.
6. The ZIM shall have LED for status indication.
7. The ZIM shall be capable to connect at least 16 Devices

Manual Call Points (MCP):

The Manual call points (MCP) shall conform to the relevant standards having the following features.

1. MCP shall be resettable Type.
2. MCP shall be either surface mounted or flush mounted.
3. Each addressable MCP will comprise of an electronic circuit built in to it to provide addressing

- capability.
4. MCP shall be addressable by Dip switch.
 5. The MCP shall have a LED to indicate Alarms

Sounder :

The Sounder shall conform to the relevant standards having the following features.

1. The Sounder shall be a Conventional sounder. (Bidder shall consider external power supply, cable, conduits, modules required for activating externally powered sounders and include the costing as part of the item – Sounders)
2. The sounder shall have a audibility level of 90dB and the volume shall be adjusted from the Fire Alarm Panel.
3. The sounder shall have the capability of being tested from the FACP.

GRAPHIC MONITORING SOFTWARE

1. The Graphic Software shall provide both Alarm Management and system maintenance tool.
2. The Graphic software shall have all the system information available on a single screen allowing quick assessment and full control over the fire alarm system.
3. The Graphic software shall able to access the individual device and zones status.
4. The Graphic software shall be connected to a single panel or series of the networked panels.
5. The Graphic software shall have a 3 access level for the software access security.
6. Building Evacuation, Alarm Silencing and Reset shall be available to any users with suitable security clearance
7. The Graphics software can be configured to provide a schematic overview of the overall site, individual floor plans and even individual rooms. Each plan is independently named and can be configured to show all devices as installed on the site.
8. The graphics software shall have event log details with a complete history of the activity of the fire system. All major control actions are recorded with date, time, user and an Optional comment field. Entries are colour coded to help easy Identification of specific types of events.

A. Batteries:

- (i) Battery shall have sufficient capacity to power the fire alarm system for not less than two hours in alarm condition and at least 8 hours in normal condition.
- (ii) The batteries are to be completely maintenance free.

B. Cables/conduits:

All cables/conduits to be laid on wall, ceiling and on the hangers wherever necessary and as directed by the authority with required hardware. The cables shall be armored PVC twisted 1.5 sq mm multi strand insulated, copper conductor, conforming to IS: 1554 and shall be of specified make. The cables shall be properly terminated and labeled.

C. Approvals:

All the equipment shall have proper listing and/or approvals and shall comply with the requirements of Underwriters Laboratories Inc. 9TH edition.