

# **TECHNICAL SPECIFICATION FOR ANALOGUE ADDRESSABLE FIRE ALARM SYSTEM**

## **1. SCOPE OF WORK**

- 1.1 The scope of work shall include designing supplying and installing testing and commissioning of Analogue Addressable Fire Detection cum Alarm System with central monitoring system. This shall conform to relevant latest standards for fire alarm systems.
- 1.2 It shall be possible to deactivate from the Fire Alarm Panel through use of Addressable Output Modules, individual AHU activated by the fire signal of specified detectors.
- 1.3 Input modules for monitoring the Fire doors zone control valves, flow switches, Fire tank water levels, Fire pumps healthy status and Third-party system monitoring.
- 1.4 The building shall have a multi zone panel with each area forming of one or more programmed zones.
- 1.5 All wiring shall be done using 2C x 1.5 Sq. mm(minimum) PVC insulated armored copper FS cable

## **2. CODES & LISTING**

All equipment and installation shall be installed in compliance with the following codes and listing:

### **A. LOCAL CODES**

- |                              |  |
|------------------------------|--|
| National Building Code- 2005 | :Fire and Life safety                        |
| IS : 2175                    | : Heat Sensitive Detectors.                  |
| IS : 2189                    | : Automatic Fire Detection and Alarm System. |
| IS : 11360                   | : Smoke Detectors.                           |

### **B. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) - USA:**

- |          |                              |
|----------|------------------------------|
| NFPA 72  | National Fire Alarm Code     |
| NFPA 76  | Telecommunication Facilities |
| NFPA 318 | Clean Room Applications      |
| NFPA 101 | Life Safety Code             |

### **C. UNDERWRITERS LABORATORIES INC. (UL) - USA:**

- |        |  |
|--------|--|
| UL 268 | Smoke Detectors for Fire Protective Signaling Systems                  |
| UL 864 | Control Units for Fire Protective Signaling Systems 9th Edition Listed |
| UL 268 | A Smoke Detectors for Duct Applications                                |

UL 521	Heat Detectors for Fire Protective Signaling Systems
UL 464	Audible Signaling Appliances
UL 38	Manually Actuated Signaling Boxes
UL 346	Water flow Indicators for Fire Protective Signaling Systems
UL 1971	Visual Notification Appliances
UL 228	Door Holders

### **3.0 TERMINOLOGY, DEFINITIONS**

#### **FIRE ALARM PANEL (FACP)**

- a. This is a microprocessor – based panel which shall be connected to the various detectors / devices by means of 2 wire loops.
- b. The fire alarm control panel shall be able to supervise individual detectors for proper performance as well as to give pinpoint location of fire alarm.
- c. The panel shall have Sounder alarm as well as facility for cutting off of AHUs and ventilation fans.
- d. The System shall also have the facility for automatically dialing select phone numbers in case of fire.
- e. RS485 Modbus/BACnet interface for IBMS integration / monitoring.

#### **3.1 Loop Card**

- a) A loop shall mean a 2-wire circuit connecting minimum 254 addressable detectors / devices.
- b) The loop card shall have built in short circuit protection to accommodate Class A wing.
- c) The loop card shall be of modular construction.

#### **3.2 Addressable Devices**

This term indicates the complete group of addressable devices such as detectors, call stations, addressable output / Input modules etc.

#### **3.3 Detectors**

- a) The detector shall be analogue addressable type.
- b) The chamber should be easily removable for the purpose of easy maintenance.
- c) The address programming shall be done by a Base / detector or from the Fire alarm panel.
- d) The detectors shall have a common base to allow easy interchange of various types of identification plate for physical addressing / tagging

#### **3.4 MANUAL CALL STATION**

- a) The manual call station shall be addressable type with define the device / location.

- b) The manual call station shall be breakable type / double action and resettable type with suitable protection and base box.
- c) Identification plate for physical addressing / tagging.

### **3.5 Output Module**

- a) Output module shall mean addressable points from the Fire alarm control panel with potential free contacts for tripping of AHU s power supply etc. as required.
- b) The system shall also be able to handle separate modules to interface the speakers of the public Address system.
- c) Identification plate for physical addressing / tagging.

### **3.6 Input module**

- a) The input modules shall be of dual / single point type.
- b) The dual channel module shall be selectable for normally open or closed .
- c) Identification plate for physical addressing /tagging

### **3.7 Fault Isolator Module**

- a) This unit shall be placed on the loop preferably after every 20 devices and between fire partitions and shall be able to isolate electrical short circuit in the wiring.
- b) All the other detectors shall remain functional because of the Class A wiring of the loop.
- c) The isolator shall not utilize an address and shall be built into the detectors base wherever required.

### **3.8 Sounders / Strobe**

- a) The sounders shall be addressable type / connected by addressable module.
- b) The sounders shall drive power from separate cable with voltage adopter.
- c) It shall be capable of being directly mounted on the wall/ceiling or along with the detector.
- d) The sounder with control Module with strobe light with minimum 85db audible and control module, power supply units etc., at 1 meter for Audible Annunciation and 110 cd for factory area and 75 cd in office area flashing at 1 Hz for visual indication with control module. The sounder with control module shall be flush or surface mountable type with all accessories etc., complete and as per technical specifications, shall be used of UL Listed / FM approved. The unit shall have inbuilt/external isolator Module.

## **4.0 SPECIFICATIONS**

### **A. FIRE DETECTION & ALARM PANEL**

#### **General**

1. The Panel shall be UL 9<sup>th</sup> edition listed/FM Approved and shall comply to the latest amendments of NFPA 72.
2. The panel shall be a Microprocessor based, Analogue addressable networkable and Intelligent.
3. The panel shall have all necessary provisions for interfacing with BMS, smoke evacuation system, Air handling units, firefighting equipment, elevators, access control system, and other third-party systems.
4. In the event of CPU failure, all Signalling Loop Circuits (SLC)/Device Loop Card (DLC) modules shall fallback to degrade mode. Such degrade mode shall treat the corresponding SLC/DLC loop control modules and associated detection devices as conventional two-wire operation. Any activation of a detector in this mode shall automatically activate associated Notification Appliance Circuits.
5. The system shall support a detector response time to meet world annunciation requirements of less than 3 seconds

#### **MAIN FIRE ALARM CONTROL PANEL (FACP)**

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 loops. 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 FACP shall have the facility to connect the Printer by using Interface module directly to the panels. 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 750 groups with label, built in visual alarm indication for minimum 40 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 provision to connect with a Public addressing system thru RS485 for seamless integration without any third party modules, the grouping of FACP shall be correlated with corresponding zones in PA system.

The FACP shall have the following functions activated through the touch keypad:

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

Loop card should have built in intelligence with 32bit controller with auto addressing facility in respect to the slot it is inserted, 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.

### **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 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.

## **B. FIRE ALARM SYSTEM DEVICES**

### **General**

1. Each device shall be UL Listed / FM Approved.
2. Addressable devices shall be simple to install and maintain. They can be soft addressed / hard addressed. Devices shall be capable of being set to an address in a range of 001 to 254. Detectors shall receive power and communication from the same pair of conductors of the SLC.
3. The contractors shall not install the detectors until after the construction clean-up of all trades is complete and final.
4. Initiating devices shall be installed in all areas, compartments, or locations where required by other NFPA codes and standards or as required by the authority having jurisdiction.
5. In the event of duplicate addressing of a device, the fire panel shall indicate this as a fault condition. However, the SLC should continue to function normally with the trouble condition display at the Fire panel.
6. The standard base of the Detector shall be interchangeable with other Smoke/Heat/Multicriteria Detectors.
7. Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their

performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72, Chapter 7.

8. Addressable devices shall use simple to install and maintain type address switches.

### **C. INITIATION DEVICES**

#### **Optical Smoke Detector:**

The optical smoke detector must comply with UL 268 the general requirements for intelligent point sensors. The optical smoke detector shall incorporate photo electronic optical smoke sensors, software interlocked to provide early warning from all types of smouldering. Optical smoke detector shall be able to be operated as enhanced smoke sensors. The smoke element shall be of the light scattering type using a pulsed internal LED light source and a photocell sensor. The elements shall measure both absolute smoke levels. The smoke elements must report independently to the control panel and must be software interlinked to enable intelligent high -level decision making.

The detector shall be capable of operating within the following environmental limits.

- a. Temperature operating range -10 °C to + 37.8 °C
- b. Humidity operating range 0% to 93% RH (without condensation)
- c. The optical smoke detector shall be loop powered and addressed by DIP switches.
- d. The detector shall have at least 3 levels of sensitivity settings.
- e. The detector wiring shall be polarity free.
- f. It shall have inbuilt drift compensation facility.
- g. In case of a failure, panel shall allow to replace the detector with the same type without the need of additional programming.
- h. The detector shall change sensitivity settings based on day/night mode or with schedules based on the programming.

#### **Multisensor Detector**

- a) All detectors shall be fitted with plug in system type, from the maintenance and compatibility point of views.
- b) An alarm condition should not affect a detectors good functioning.
- c) After resetting the alarm, the detector shall resume operations without readjustment of any kind.
- d) The detector shall have a Multi sensor type integrates photoelectric smoke and fixed temperature heat sensing technology.

- e) It shall be possible to use a single detector type for both above and below false ceiling applications.
- f) The detector shall be capable of detecting fast flaming fires and slow smoldering fires equally well.
- g) The detector shall therefore be a multi technology detector or shall be of unique design whereby a single type / model can be used in applications where either ISD/OSD would be normally used.
- h) The detector shall be suitable for low voltage (between 17to 28V DC) two wire supply .
- i) The detector shall be provided with Twin LED indication.
- k) The sensitivity of detector shall be set from the Fire alarm control panel to suit the site requirement.

### **Heat Detector**

- a. Heat detector shall go into the alarm mode when the temperature reaches 59degree Centigrade in normal course or rapid Change in temperature 11degc per minutes
- b. It shall have in built locking mechanism to check the removal and pilferage of the detector.
- c. The quiescent current flow must not exceed 500 micro amps and alarm condition current shall be maximum 30milli Amps.
- d. The heat detector shall be Analogue Addressable type and be able to send analogue output to the Fire alarm control panel regarding its condition.
- e. It shall be able to communicate with the Fire alarm control panel by the pulses emitted from the Fire alarm control panel.
- f. The detector should be addressed through base / detector and address store in a non-volume memory within the sensor or by a decade switch.
- g. The base of the detector shall be electronics free and interchangeable with other smoke or heat detectors.
- h. The enclosure shall meet as per the relevant protection grade.
- i. The voltage rating shall be between 17V – 28V DC though the voltage may be changed depending upon the working voltages of a proprietary FACP
- j. The Detector shall have UL/FM approval.
- k. It shall be possible to test the detectors working both from the FACP as well as locally.
- l. The detector shall have twin LED's for 360 degree viewing angle.
- m. LED on the detector shall blink each time the sensor is scanned by the Fire alarm control panel.
- n. If the Fire alarm control panel determines that the sensor is in alarm, the Fire alarm control panel will command the sensor LED to remain on to indicate the same .
- o. Each sensor shall be capable of being tested for alarm via command from the Fire control panel,



**Addressable Manual Pull Stations**

- a. Stations shall be of the dual action design. Addressable manual fire alarm boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch and the addressable communication module status. They shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.
- b. All operated stations shall have a positive, visual indication of operation and utilize a key type reset.
- c. Manual fire alarm boxes shall be constructed of Poly carbonate / MS with clearly visible operating instructions provided on the cover.
- d. The voltage range shall be from 17V-28V, It shall have protection as per relevant standard.

**Addressable Zone Interface Module (ZIM):**

- a. The zone Interface module (ZIM) will facilitate connection of conventional detectors in the same circuit /loop consisting of addressable detectors.
- b. The ZIM shall be capable of powering the detectors through the auxiliary source and shall supervise the IDC power supply.
- c. The ZIM shall communicate alarm and troubles related to detector and power supply to the Panel.
- d. The ZIM shall allow resetting conventional detectors from the panel.
- e. The ZIM shall have LED status indication
- f. The ZIM shall be capable to connect at least 16 Initiating Devices.

**Duct Smoke Detector:**

- a. The smoke detector housing shall accommodate either an intelligent ionization detector or an photoelectric detector, of that provides continuous analog monitoring and alarm verification from the FAC panel.
- b. When sufficient smoke is sensed, an alarm signal is initiated at the FACP, and appropriate action taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system
- c. This design of the housing along with the detector technology is capable of detecting unsafe conditions by sampling the air through the duct. When the smoke is detected, it will gives a signal that will create the proper action to be taken to turn off circulating fans, blowers and any other auxiliary devices that are connected to the system through Fire Alarm Control Panel.
- d. The actions taken will enable the management of hazardous smoke through the entire space that is being protected by the duct detection arrangement.
- e. This detector can be installed on any side of the duct. At velocities below 300ft./min the diverter model RE-428DU-DV (ordered separately) needs to be installed for normal operation. For velocities above 300ft./min the

diverter is not required for normal operation. The venturi tubes are available in 4 lengths 1, 2, 5 and 9 ft (0.3, 0.6, 1.5 and 2.8)

**Beam Detector:**

The Beam Detector Shall confirm to the relevant standards having the following features.

1. Shall have a Infrared transmitter and receiver in a single housing.
2. Shall have an interoperating Prism Reflector.
3. Shall supports 50 meter & 100 meter in range.
4. Shall have an inbuilt LASER light for easy alignment with the reflector.
5. Shall have auto alignment.
6. Shall have inbuilt Drift level compensation.
7. Shall have three levels of sensitivity threshold settings (i.e) 25%,35%,55% &85%
8. Shall operates on the temperature of -25deg C to 55 Deg C
9. Shall operate on 24VDC power supply.
10. Shall have a provision to connect the Response Indicator.
11. Shall have 2 Green LEDs and 1 Yellow LED for alignment status.
12. UL listed approval.
13. Housing colour in White RAL9016, UV stable

**SOUNDER:**

- a) The sounder shall be addressable electronic type and shall give discontinuous / intermittent audible alarm whenever any detector or call box operates.
- b) The sound output from the sounder should not be less than 85 decibels at one meter
- c) The sounder shall be powered from Main Fire alarm control panel through separate 2 wire cable.

**Sounder cum Strobe:**

The Sounder Cum Strobe shall confirm to the relevant standards having the following features.

- a. The Sounder Cum Strobe Shall have audibility level of 85dB.
- b. The Sounder Cum Strobe shall have 4 Candela setting 15/30/75/110cd flashing capacity at 1HZ for Visual indications.
- c. The Sounder Cum Strobe shall be integrated with Control Modules with necessary auxiliary voltages.
- d. The Sounder Cum strobe shall be working on 24VDC auxiliary power supplies.
- e. The sounder shall have two audible tone settings.
- f. Shall be UL listed

**Strobe:**

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

- a. The Strobe shall have 4 Candela setting 15/30/75/110cd flashing capacity 1HZ for Visual indications.
- b. The Strobe shall be integrated with Control Modules with necessary auxiliary voltages.
- c. The strobe shall be working on 24VDC auxiliary power supplies.

**MIMIC PANEL:**

- a. The mimic system uses flexible, LED guide to illuminate the areas on a floor plan. This unique system distributes completely with wiring and allows indicator to be moved, removed or added on site without the need for any wiring.
- b. All indicators can be configured via zone grouping through the FACP. The Mimic panel shall be supplied with common LED s and Controls. The Common LED s are like Power On, Fire & Fault. Housed in attractive & slim enclosure to match AVANI fire alarm panel with high quality, full color or monochrome floor plans.
- c. Up to 512 LEDs can be controlled from AVANI FACP (Stand alone or Network) Available in a range of standard enclosure to suit any application and Customized size can be made up on request.

**Batteries:**

- (i) Battery shall have sufficient capacity to power the fire alarm system for not less half an hour in alarm condition and at least 24 hours in normal condition.
- (ii) The batteries are to be completely maintenance free.
- (iii)The batteries shall be of Lead acid type.

**Ethernet (TCP/IP) module:**

The Ethernet Module provides a communication between local network and fire alarm control panels using the RJ45 communication protocol. The user shall take a control over and monitor fire alarm panel from the local Personal computer. This central monitoring software shall install to maximum 4 personal computers and among them one PC shall be Configured as master who can control over the Fire Alarm Panel.

10/100M auto-sensing Ethernet mini card for embedded device networking.

Ready-to-use TCP/IP firmware for fast integration. TCP Server & UDP driver operation modes.

Easy configuration with Web browser, serial console, Telnet console or Windows utility.

### **CMS Software:**

- a. CMS software shall monitor and control maximum of 64 panels thru Local area network and Wide area network.
- b. All the panels in the network shall have a static IP address on Local Area Network.
- c. All the panels in the network shall have single public static IP address on Wide Area Network.
- d. The Bandwidth of the LAN or the WAN shall be of minimum 1Gbps.
- e. CMS shall be GUI based User Friendly Software
- f. CMS shall be able to identify the fire with location name as shown in the fire alarm control panels.
- g. CMS shall be able to identify the faults in the FACP.
- h. CMS shall have facility to program the location of the devices.
- i. CMS shall have the Event storage facility and printing facility of the events.
- j. CMS shall have configurable Visual and Sound Alerts for the fire and fault conditions
- k. CMS shall have Instant Pop-up alerts for any fire and Fault Events to override the existing application on the screen.
- l. CMS shall have the acknowledgement facility.
- m. CMS shall get stored all the events in the networked panel.
- n. CMS shall have two Level of access Admin and User levels

### **GSM Module:**

- a. GSM Module Interface integrates with Analogue addressable Fire Alarm
- b. Control Panel through the RS485 protocol. If any fire is detected in fire alarm control
- c. Panel, text message will be sent to specified mobile number for fire condition with details of
- d. Devices address and loop card. The mobile number shall be configured to GSM module
- e. Through the Software.
- f. Communication Interface: Addressable Panel to GSM Module via Rs485.
- g. GSM Module to PC interfaces via Rs232.
- h. Quad Band GSM/GPRS : 850 / 900 / 1800 / 1900 MHz
- i. Built in SIM (Subscriber Identity Module) Card holder
- j. Notification includes location details
- k. Configurable notification on all or priority basis.
- l. Maximum of 10 mobile numbers can be configured through the GSM module software.

## **Network Control Station (Graphical software)**

### **SCOPE:**

- a. PC based graphical facilities monitoring system shall be installed in accordance to the project specifications and drawings.
- b. The PC based graphical facilities monitoring system shall include, but not be limited to, one or more PC based graphical workstations, all input/output devices, network
  - a. communications media, control equipment, auxiliary control devices, power supplies,
  - b. wire / fiber optic media as shown on the drawings and specified herein.
- c. A supervised interface to fire alarm control panels shall be made available.
- d. The system shall employ an advanced technology network to monitor and control
- e. various fire, and other facility information over a LAN Works network.
- f. Proprietary network systems that cannot interface to existing addressable fire alarm
  - a. systems at the facility or systems requiring the use of a "dry contact" or "voltage
  - b. monitoring" interface shall not be accepted.
- g. The system shall be electrically supervised and monitor the integrity of all conductors.

### **WORKSTATION PERFORMANCE:**

- a. The network will interface and report the individually monitored system's status via a User-friendly Graphical User Interface (GUI) based software workstation.
- b. The software shall operate under Microsoft® Windows® XP Professional as Manufactured by Microsoft Corporation.
- c. The GUI based software must be capable of graphically representing each facility being monitored with floor plans and icons depicting the actual locations of the various systems; and / or sensors' locations.
- d. The software shall use a 1024 X 768 GUI display capable of showing a large primary floor plan display, a key map representative of a larger view of the primary display and its relationship to the facility being monitored, the current operator, number of fire, supervisory, pre-alarms, troubles and events within the network as well as outstanding events and acknowledged events.
- e. The workstation shall have the ability to support graphic printing of all data including graphical floor plans, system activity, history, and guidance text. A Windows compatible printer shall be supported for the graphics and report printer options.
- f. The workstation software shall permit automatic navigation to the screen containing an icon that represents the system or sensor in the event of an off-normal condition.

- g. The system/sensor icon shall indicate the type of off-normal condition and shall flash and change to the color associated with the off-normal condition (e.g., RED for ALARM and YELLOW for TROUBLE).
- h. The software shall allow the attachment of text (TXT) files, sound (WAV) files.
- i. The software shall allow the import of externally developed floor plans in DWG & DXF.
- j. The software shall provide auto-navigation to the screen containing the icon of any
  - a. system or sensor when an event is initially annunciated. In addition, operator
  - b. navigation to screens containing outstanding events shall be accomplished by
  - c. "clicking on" the event from either the acknowledged or unacknowledged event.

### **History Manager:**

The software shall contain a History Manager, which shall record all system events with a time and date stamp as well as the current system operator's name.

- a. The system shall provide for the ability to store all off-normal events experienced by
  - i. the various sub-systems that are monitored by the system.
- b. All events shall be recorded with a time and date stamp and the system operator
  - a. Shall be provided with the ability to log a pre-defined response.
  - b. comment for each off-normal event and have that comment stored in the history
  - c. file with the time, date and operator name.
- c. Provide for the ability to conduct searches and generate subsequent reports,
  - a. based on all events for a single system / device address, a specific node, a specific
  - b. type of off-normal condition and date range (mm/dd/yy to mm/dd/yy).

### **Reports & Logs:**

- a. The system shall provide for the ability to generate reports based on system history.
- b. The system shall allow the system operator to enter custom comments up to 160 Characters for each event and have those comments recorded in the system's History file.

### **WorkStation:**

- a. The system shall be a Facilities Monitoring System.
- b. The system shall operate on an UL listed Intel Pentium 4 processor operating at no less than 1.8 GHz on the Microsoft® Windows® 8 and above.

- c. The workstation shall have: no less than 8GB of RAM, a hard drive with no less than 1 Terabytes of storage space, a minimum of 8 megabytes of video RAM, a CD-R/W for system backup, internal supervisory CPU watchdog board with audible annunciator, 100 Base-T Ethernet NIC card, a 104 key keyboard, and a mouse type pointing device.
- d. The workstation shall come equipped with all necessary gateway modules to allow connection to the network it monitors as standard equipment. All workstations shall support Ethernet communications when multiple workstations are required.
- e. The workstation shall support an SVGA monitor and be supplied with a 17" flat screen LCD monitor.
- f. The computer shall be capable of networking to additional computers and these Computers shall be capable of operating as workstations and/or gateways for local area or wide area networks.
- g. Alarm annunciation shall appear on all workstations and may be silenced at each local Workstation.
- h. Only one workstation and operator shall be in command of the system for global alarm acknowledgement at any time.

#### **MODBUS:**

The AFD shall communicate the Modbus protocol using the on board RS485 connection. The device shall be able to receive remote configuration as well as the monitored remotely. Shall give full status of all detectors, outputs & inputs for FACP available as RS 485 & RJ45 interface. It can be interface SCADA, IBMS etc.

#### **SUBMITTALS :**

After award of work, the bidder shall submit following with in fifteen days:

##### **A. General:**

- a. Three copies of all submittals shall be submitted to the Engineer in charge for review.
- b. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality

##### **B. Shop Drawings:**

- a. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
- b. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
- c. Show annunciator layout, configurations, and terminations.

##### **C. Manuals:**

- a. Submit simultaneously with the shop drawings, complete operating and maintenance manuals listing the manufacturer's name(s), including technical data sheets.
- b. Wiring diagrams shall indicate internal wiring for each device and the interconnections between the items of equipment.
- c. iii. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.

**D. Software Modifications**

- a. Provide the services of a factory trained and authorized technician to perform all system software modifications, upgrades or changes. Response time of the technician to the site shall not exceed 24 hours.
- b. Provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site.

**E. Tests & Test Reports**

- a. Tests certificates shall be furnished for approval of all Fire alarm devices and system devices.
- b. ii. All routine tests as per relevant codes for the Fire Alarm Panel, shall be conducted and results furnished to the Project Manager.

**G. Warranty:**

All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance by the end user. The full cost of maintenance, labor and materials required to correct any defect during this one-year period shall be a part of the bid.

**H. Post Contract Maintenance:**

- a. Complete maintenance and repair service for the fire alarm system, shall be available from a factory trained authorized representative of the manufacturer of the major equipment for a period of 4 years after expiration of the warrantee.
  - a. In the Sub Work II, the bidder shall quote for a maintenance contract to provide all maintenance, tests, and repairs described below. Submittals that do not identify all post contract maintenance costs will not be accepted. **Rates and costs shall be valid for the period of Two (2) years after expiration of the warrantee of 12 months from date of handing over the system to client.**
  - b. Maintenance and testing shall be on a monthly basis or as and when required by the Project Manager. A preventive maintenance schedule shall be provided by the contractor describing the protocol for preventive maintenance. The schedule shall include:
    - 1 Systematic examination, adjustment and cleaning of all detectors, manual fire alarm stations, control panels, power supplies, relays, water & flow switches, and all accessories of the fire alarm & DVC system.
    - 2 Each circuit in the fire alarm system shall be tested semi-annually.
    - 3 Smoke detector shall be tested randomly in accordance with the requirements of NFPA 72 Chapter 7.

**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 2 core 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.

**Location:**

The location of the main fire alarm control panel shall be in an easily accessible position as well continuously monitored area.