

SCHEDULE OF QUANTITIES FOR FIRE ALARAM SYSTEM

FIRE ALARAM SYSTEM

CONSULTANTS
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1.0 NAME & SCOPE OF WORK

Providing & fixing of Fire Alarm System at Spiritual Growth Center, Katra. The work shall consist of furnishing, installation, testing & commissioning of a complete high quality advanced technology early detection Intelligent Analogue Soft Addressable fire alarm system as shown on the drawings and specified herein.

1.2 QUALIFICATION FOR ELIGIBILITY TO TENDER:-

The tenderer should be specialist in the field of acoustic work and should have successfully completed at least two similar types of works for Cinemas, Auditoriums, Studios during last Three years of not less than 10 lacs(ten Lacs) value. For which the tenderer shall have to produce supporting documents giving date of award, date of commencement etc from the concerned competent authority in proof thereof.

2.0 PROCEDURE OF TENDERING

The procedure for submission of tender document is as follows which should be strictly followed and no deviation in the procedure will be accepted.

- a) Submission of technical bid & financial bid.
- b) Conferencing with the bidders for technical discussions.

3.0 SUBMISSION OF TECHNICAL BID: -

The following documents should be submitted in two sealed envelope super scribed as "Technical bid " & " Financial bid" in separate cover which should reach this office on or before -----
--- at -----.

- a) Both these sealed envelopes should be kept in a third envelope and sealed and super scribed as "Technical bid with EMD".
- b) List of similar type of jobs executed in the past and certificate with date of having successfully completed from concerned competent authority in proof thereof.
- c) Technical leaflets of important material proposed to be used.
- d) Deviations from the commercial technical specifications to be spelled out separately giving reasons for such deviations. However, acceptance of these by the competent authority depend on the Consultants decision.

SUBMITTALS ALONG WITH TENDER :

- 1. Product data for fire alarm system components including dimensioned plans, sections, and elevations showing minimum clearances, installed features and devices, and list of materials and data.

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2. Shop drawings.
3. System operation description including method of operation and supervision of each type of circuit and sequence of operations for all manually and automatically initiated system inputs. Description shall cover this specific project.
4. Product certification signed by the manufacturer of the fire alarm system components certifying that their products comply with any one of the referenced standards, completely with specifications and Vds approval or equal.

4.0 **FINANCIAL BID** :-

The documents to be submitted with financial bid are as follows :

- a) The contractor should give his Rates both in figures and in words duly filled in the bill of quantities in a separate sealed envelope super scribed as "FINANCIAL BID".
- b) All entries (individual rates, sub-totals & grand totals) should be filled in English alphabets and Arabic numerals only either typed or clearly hand written by ballpoint pen. All correction if any made by the bidder should be initialed as many times as corrected.
- c) On tender scrutiny, if difference is found in rates given by the bidder in words and figures in individual rates or in sub-totals or in grand totals the procedures for deriving the final value shall be as follows.
- d) The item rates quoted by bidder shall be taken as correct in cases where amount worked out of any item does not correspond to the rates written in figures or words.
- e) For items where the bidder has not written item rates the highest rates quoted shall be taken as correct for such items for loading purposes and lowest rates for execution purposes.
- f) Bids can be sent by registered post at the risk and responsibility of the bidder. Any bids received after the time and date of submission of bids shall not be entertained.
- g) Before submission of the bids, the bidders are advised to visit site and get acquainted with site conditions, availability of materials/labour. All clarifications must be sought by the bidders well in time and no extension of time shall be given on this account.
- h) The bidders are advised to account for any fluctuations in market rates of material/equipment cost/labour rates. Any claims on these accounts shall not be entertained after the award of work unless specifically agreed to.
- i) Bids not submitted on prescribed form is liable to be rejected. Bidders are advised to quote original offer as per bill of quantities.
- j) In case drawings and details are not enclosed with tender documents, these can be seen in the office, not availing this shall not relieve the bidder of his responsibility of correct interpretation of work involved. Bidders who resort to canvassing in any form shall be liable for rejection.
- k) Bidder also has to submit shop drawings & as built drawings for approval of the consultant.

5.0 PRINTED CONDITIONS OF CONTRACT:-

Any printed conditions and conditions contrary to these conditions of contract in contractors offer shall be excluded from the contract and shall not be applicable to this contract.

6.0 VALIDITY: -

The tender shall be valid for acceptance for a period of 60 days from the date of submission of the tender.

7.0 GUARANTEE:-

The bidder should offer full guarantee of Six months for complete work from the date of satisfactory handing over of the site as certified by the consultants for faulty/bad workmanship, manufacturing defects in works. The tenderer shall guarantee the works to maintain quality on the basis of design/scheme. They shall also guarantee that the performance of the work executed shall meet the requirement as specified in work specifications.

QUALITY ASSURANCE:

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of fire alarm systems and components, whose products have been in satisfactory use in similar services for not less than 3 years period, and be subject to approval of engineer.
- B. Installer Qualifications: An experienced specialist sub-contractor who is authorized by the system manufacturer, and subject to approval of the engineer.
- C. All the components and installations shall comply with the requirements of DIN VDE 14675 & VDE 0833 for design & installation.
- D. Provide system and components specified in this section that are listed and approved by Vds & conform to equivalent DIN/EN standards.
- E. Single source responsibility: All components and accessories shall be product of single manufacturer.

8.0 REPAIRS/REPLACEMENTS OF WORK DURING GUARANTEE :-

Any defects or other faults which may appear within defect liability/guarantee period of Six months satisfactory working conditions, arising in the system due to material or workmanship should be corrected and replaced with parts of original specifications and makes by the contractor at his own cost.

PART 2 – PRODUCTS

2.01 SYSTEM DESCRIPTION:

A. The fire detection and alarm system shall comprise of Automatic Soft Addressable Modular design main fire alarm control panels, Dual optical smoke & heat MULTI Sensors , Blue LED Optical Smoke & Heat MULTI Sensors, Optical Smoke / Heat/ CO Gas MULTI sensors, Loop powered Dual Optical Smoke/Heat sensor with integral Sounder / Flasher / Speech units, manual call points, electronic wall mounted Alarm sounder/flasher/speech combined devices, Transponder interface units, each with its own short circuit built-in isolators. All loop cabling and any other components and accessories deemed necessary for a safe, reliable and satisfactory system shall conform to the relevant and applicable requirements and recommendations of DIN EN 54. The system shall be fully programmed to accommodate fire alarm zones. The system shall be configured to allow on site modifications with the minimum of disruption using the PC based software to facilitate future changes or alterations to existing buildings/network on site.

B. The fire alarm and detection system shall provide the following facilities as a minimum:

The system shall be intelligent in operation with advanced decentralised intelligence technology. Each detector shall have its own processor with algorithms built in the device to take a fire or fault decision. System with centralised intelligence by providing signal levels to the control panel are not acceptable.

The system will be capable of providing fire, fault disablement and supervisory monitoring facilities as required by DIN EN 54 Pt 2. All devices on a loop shall have built in SHORT CIRCUIT LINE ISOLATORS for wiring fault isolation to protect the system. "Group Circuit Monitors" which isolate/protect sections of a loop circuit, i.e. a group of field devices are not acceptable.

All system components and devices shall be connected to two-wire loop circuits (as shown in the typical schematics) with each component having its own individual built-in isolator, should have sensors with integrated sounder in a same unit and no extra cabling should require to power up the sounder. Removal or disconnection of any component from the loop shall not affect the functioning and performance of other components and the system. Please note that the group isolators, which are used to isolate a section of a loop in case of fault, are not acceptable.

System shall be of automatically addressable type i.e. all the devices on the loops of the FACP shall be allocated addresses automatically from the PC / panel at the time of system power. The loop devices shall also be able to commission by using PC interface without the need of FACP.

And also given an address during commissioning, the value of which shall be stored in non-volatile memory, within the electronics module of the outstation. This value shall be read during loop allocation and provided it is valid shall be used to setup the outstations primary

address.

Automatic Addressing shall cover the benefits of Soft Addressing and also overcome the limitations of Hard Addressing. This means that If the devices are inserted or removed all the existing devices shall keep the same address and programmed activations and use labels remain unchanged. The panel with PC shall allocate the address to ensure that it is impossible for two devices to have the same address. Fire Detection and Alarm Systems, which rely only on Coding , Programmer or hard addressing techniques are not acceptable.

Facilities shall be provided to constantly monitor and check the following circuits and fault conditions:

- The power supply to the loop /s;
- For open-circuit, short-circuit, earth fault and any other fault condition in the loop wiring;
- For communication failure and errors in all cards and loops
- For faults in keyboard and printer circuits
- All devices, etc. shall be installed on the same loop.

All devices shall be assigned a maximum of 25 character or 2 lines of max. 30 characters each with a ¼ VGA Display. In case of fire, fault or warning, the label of device sensing threshold shall appear on visual display unit of the panel.

Any event i.e. Fire, fault or warning shall be recorded with time, date and place of occurrence in the memory of FACP. These events can either be displayed on normal or ¼ VGA Display of the FACP or printed, as required. Provision shall be done at the fire alarm control panels to silence the loop powered alarm sounders but the visual indication shall remain until the system is reset. The detectors shall have auto learn sensitivity adjustments. The main fire alarm control panels shall be located as shown on the schematics and the floor drawings.

2.02 GENERAL

A. All major component of fire alarm system shall be product of a single manufacturer and shall conform to the requirement of EN54, Vds approved and be designed acc. to DIN VDE14675 and VDE 0833 Fire Alarm Systems CODE OF PRACTICE FOR SYSTEM DESIGN, INSTALLATION AND SERVICING.

B. The power supply breakers for FDA system shall be marked “ DO NOT DISCONNECT. FIRE ALARM SUPPLY”

2.03 ANALOGUE ADDRESSABLE FIRE ALARM CONTROL PANEL (FACP)

A. In the event of a fire being reported from the smoke/heat Detectors, activation of manual call points or sprinkler operation the sequence of alarm operation shall be as follows: If a fire condition is reported from a smoke detector then the evacuation will be done initially by the local integral sounder. Then after a certain delay (to be agreed at the time of commissioning) the evacuation message shall be announced on that fire zone only. If after 3 minutes the alarm has not been acknowledged, the evacuation message shall also be announced on the other adjacent zones. All other zones shall be given the Alert message. The evacuation of the building shall be staged in phases to allow orderly movement of people.

B. If a Manual Break Glass Unit is activated or a sprinkler flow switch is

operated, then the evacuation shall be transmitted immediately to the affected fire zone plus the adjacent zones.

- C. Activation of the fire alarm system shall directly initiate some or all of the following to be agreed as a part of the overall engineering policy.
- Signal to all elevator machine rooms indicating fire status (to control lifts)
 - Release doors normally locked by magnetic devices.
 - Release doors normally held open by magnetic devices
 - Shutdown mechanical equipment ventilation plant
 - Shutdown general exhaust fans
 - Start up smoke extract fans
 - Start up exhaust make up fans
 - Start up stair vestibule pressurization fans
 - Automatically operate fire dampers
 - Initiate alert signals to panels in the adjacent office tower.
 - Sprinkler valves, flow switches and other monitored valves shall be directly supervised by the fire alarm systems. These shall include but not limited to the following:
 - Building automation system via WINMAG OPC
 - Emergency lighting system
 - Security system.

2.04 SYSTEM COMPONENTS AND DEVICES

FIRE ALARM CONTROL PANEL:

- A. The panel shall be modular Multifunctional computer controlled using **32 bit processor**. De-centralised control and monitoring functions to be realised on the loop and spur.. The panel shall be complete with, but not limited to, the following elements:
- 1) Visual display unit capable of displaying 8 lines 40 characters backlit display / VGA display as optional.
 - 2) Built-in optional 40 character internal protocol thermal printer or external.
 - 3) Built-in full numeric keyboard with function keys.
 - 4) 64 Single Zone Indicator expandable upto 192 SZI
 - 5) USB Port
 - 6) SMART Card media slot.
 - 7) Keyswitch to prevent unauthorised operation of keypad.
 - 8) Integral sealed lead acid battery and charger, with 24 hour back up in the event of supply mains failure.
 - 9) Essential controls – Delay, panel reset, Audible alarm off, Disconnect master box, additional messages, verify/cancel fault buzzer. Fire, Pre-Alarm, Trouble, Disconnection lamps. Each lamp shall also have appropriate indication (Releasing Systems activated, Master box, Delay , Verify, CPU failure, Inoperation normal condition & failure of powersupply / battery) Simple menu driven function keys with password protection shall allow users to an extensive range of software based features such as:

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- Service
 - Time functions
 - Informations
 - Last 10000 system events
 - Current fault and warning logs.
 - Interrogation of sensor cleanliness
 - On/Off, Enable/ disable sensors, zones, sounders, interface unit channels.
 - Status of detectors
 - Alarm counters
 - Printer on, off, line feed and test facilities.
- 10) All control buttons and keyboard shall be enclosed behind a lockable cover, Up to 127 device capacity per 3.5km loop and a TTY/ RS 485 communication option.
- 11) In addition to the above, all other necessary controls, elements and accessories shall be included to provide a complete and efficient panel conforming to the requirements of DIN EN 54.
- 12) LOOP PARAMETERS:

Individual loop circuits will be capable of accommodating the following.

- Up to a maximum of 127 addressable devices on 3.5 kms loop length
- Up to 32 loop powered IQ8 Alarm addressable Sounders.
- Up to 32 loop powered IQ8 Alarm electronic Strobes.
- Up to 32 loop powered combined electronic sounders and strobes
- Up to 80 sensors with integral alarm sounder
- The detection loop shall have the ability to support both sensors and sounders connected on the same 2 core loop circuit.
- Up to 127 loop powered input modules.
- Should have the ability to spur off the detection loop without using 'T' breaker devices, without any degradation.

2.06 SYSTEM EVENT PRINTER

A. The system printer shall be 40 character thermal printer optional in-built on the main control panel, and shall log all events, change of status, alarm and fault messages along with time of the day and date. An external 80 couloumn dot matrix printer along with system PC is also recommended.

The printer shall provide the following:

- Hard copy of every event occurring
- Status read out of every addressable point
- Devices tested on a walk test
- Contaminated detectors needing replacement
- Single point scan printout of analogue values
- Hard copy of historic log.

2.07 FIELD DETECTION DEVICES

GENERAL: ANALOGUE DETECTORS & BASES

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All analogue detectors and bases shall be provided by the same manufacturer of the control system. No other make of detectors will be permissible.

All analogue detectors shall have real intelligence itself. This means even without control Panel the detector can make decision, adapt to different environmental condition and diagnose itself. They shall have decentralised intelligence , automatic function self test, CPU failure mode, alarm and operating data memory and integrated short circuit line isolators. The detector bases for interfacing between the loop wiring and the detector head shall be manufactured by means of injection moulded ABS plastic coloured white and shall not contain any electronics for addressing. The base fixings should be suitable for any industry standard BESA or conduit boxes. All bases shall include the option to provide a programmable relay output for interfacing, providing a dry contact for third party.

All bases shall be provided with a plastic removable dust cover for protection during site construction as well as an IP rated sealing gasket to prevent dirt and moisture from entering through from the fixing surface.

Each base shall include a lock and removal of locked detectors shall be achievable only through the use of the appropriate removal tools as specified by the manufacturer of the detectors. Detectors removal tools are to be handed over on completion of the contract as part of the spare parts to the client.

Removal of a detector from it's associated base shall not affect the continuity of the detection loop.

The Fire alarm manufacturer shall have the complete range of following analogue ADDRESSABLE detectors with decentralised intelligence as standard so as to meet the specific applications of the site.

- a) Heat Detectors (fixed & ROR temperature)
- b) Optical Smoke Detector
- c) Optical Smoke & Heat Detector
- d) Dual angle Optical/Heat Detector
- e) Blue Light Optical / Heat Smoke Detector
- f) Optical Smoke, Heat & CO gas Detector
- g) Optical Smoke detector with integral Sounder
- h) Dual angle Optical/Heat detector with integral Flasher
- i) Dual angle Optical/Heat detector with integral Sounder
- j) Dual angle Optical/Heat detector with integral Speech Sounder
- k) Dual angle Optical/Heat detector with integral Flasher and integral speech sounder
- l) Duct mounted sensor
- m) Radio Frequency wireless analogue detectors
- n) Manual Call Points

All of the above shall be compatible with the aforementioned base providing interchangeability between detector heads, without the requirement for switch settings. All detectors shall also have an integral short circuit isolator, which in the event of a single cable fault will isolate the "culprit" piece of cable and retain all devices on the loop operationally.

Each detector shall possess two integral LED giving a red flashing indication for fire and green for normal operation. For remote locations, each detector shall be capable of connection to a remote LED unit by means of 2 core wire connection.

Detectors shall be white in colour and manufactured from ABS plastic. All electronics and associated sensing elements will be housed within this unit, these components being hermitically sealed to prevent their operation from being impaired by dust, dirt and humidity.

The sensitivity of all detectors shall be adjustable from a software. It shall be possible to programme detector sensor sensitivity directly on the loop using interface with a laptop PC and appropriate programming software from manufacturer.

For MULTI SENSOR detectors, disablement of each sensor element shall be possible individually or for whole loop. Also this disablement feature shall be possible to have manually or time / event controlled.

All detectors shall be provided with a plastic removable dust cover for protection during site construction.

A semi-flush recessing kit for analogue detectors shall be available for each detector type incorporating the standard detector base.

2.07 (a) HEAT DETECTORS

Install as shown in the drawings. These shall comply with the requirements of EN 54: Part 5 and shall be VdS approved. This shall be a dedicated heat only detector to provide fixed temperature heat as well as rate of rise sensing. It should be fully compliant with EN54 part 5 to provide grades of A1.

2.07 (b) OPTICAL SMOKE DETECTOR:

Install as shown in the drawings .Analogue Addressable Optical Smoke Detectors. These shall be of Automatic addressable Optical type with inbuilt isolator in a single head. The optical element shall detect visible smoke from slow smoldering fires. Smoke sensing design shall comply with EN 54 part 7 and shall be VdS approved. It shall have microprocessors, short-circuit isolators and all electronic components and circuitry suitable for an Analogue addressable system. The detectors shall also have 360 degree viewing LED fire indicator. Detectors mounted in the false ceilings shall be provided with semi flush mounting kits.

2.07 (c) OPTICAL SMOKE /HEAT DETECTOR

Install as shown in the drawings .These shall comply with the requirements of EN 54: Part 5 & 7 and shall be VdS approved. These detectors shall have combined two individual sensing elements to provide excellent cover for both types of fires (slow smoldering & fast free burning fires). These detectors shall be of Automatic addressable Combined Optical/Heat type with inbuilt isolator in a single head.

Optical sensing shall be carried out by means of an Infra-red LED transmitting a pulse of light across an obtuse angled chamber & heat sensing shall be carried out by a thermistor, sampling the surrounding environmental temperature.

2.07 (d) DUAL ANGLE OPTICAL/HEAT DETECTOR

Install as shown in the drawings .These shall comply with the requirements of EN 54: Part 5 & 7 and shall be VdS approved. This device shall combine two individual sensing elements to provide excellent cover for both "types" of fires. (Slow smoldering and fast free burning).

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OPTICAL SENSING: Shall be carried out by 2 infra-red LED transmitters across 2 separate Optical detection angles. This sensor shall process both the forward and backward scattered Light caused by entering the detection chamber of device, allowing the detector to Differentiate between real smoke and non-smoke particles e.g. Steam & Dust.

HEAT SENSING: Shall be carried out by a thermistor, sampling the surrounding environmental temperature.

2.07 (e) Blue-light OPTICAL SMOKE / HEAT DETECTOR

Install as shown in the drawings. These shall comply with the requirements of EN 54: Part 5 & 7. The optical measurement chamber shall be provided with latest developed blue LED sensor technology , enabling the detection of open fire, smouldering fires and fires with high heat generation (Invisible smoke sensing). These detectors shall be capable of identifying the TF1 & TF6 test fires described in EN 54-9 specifications. These detectors shall be intelligent with time related signal analysis, signal correlation of sensor data & decentralised

HEAT SENSING: Shall be carried out by a thermistor, sampling the surrounding environmental temperature.

2.07 (f) OPTICAL SMOKE DETECTOR WITH INTEGRAL SOUNDER

Install as shown in the drawings (Hotel guest rooms / suits).These shall comply with the requirements of EN 54: Part 3 & 7.

The sensor element of the optical detector sounder shall be as per the specification for the optical smoke detector, however the device shall incorporate an internal electronic sounder.

The internal electronic sounder shall be an integral part of the detection device comprising of a piezo sounder output device providing the low and high frequency output.

The combined detector sounder shall provide a sound pressure level of 92dBA at 1 metre. The audible volume levels shall be individually selectable for each device and there should also be a configurable soft start feature that ramps up the volume gradually rather than switching on at full level.

It shall be possible to connect a maximum of 80 combined detector sounders to a detection loop.

A minimum of 19 Different tone types are stored in the detector sounders. Upto 4 different tone types shall be combined in a signal set and activated in case of alarm. Individual detector sounder volume levels shall be adjustable at the main control panel or via the use of the remote programmer unit coupled with a laptop PC and appropriate programming software from the manufacturer.

Activation of the sounder shall be independent of the detection of a fire condition by the sensing element. All sounder outputs shall be synchronised with all other loop powered detector sounder devices and other loop powered audible visual units on the panel.

Each sounder shall have its own microcomputer to handle loop communications, which along with all other associated electronic components will be hermetically sealed to provide protection from hostile operating environments.

2.07 (g) DUAL ANGLE OPTICAL/HEAT DETECTOR WITH FLASHER

Install as shown in the drawings .These shall comply with the requirements of EN 54: Part 5 & 7. The sensor element of the dual angle optical/heat detector flasher shall be as per the specification for the dual angle optical/heat detector.

The integral flasher element shall utilise a high power red LED for strobe effect. LED pulsing shall be synchronised with all other loop powered audible visual units located on the fire alarm and detection panel. The flasher LED shall be fault monitored for working operation.

It shall be possible to connect a maximum of 48 combined dual angle optical/heat detector flasher to a detection loop.

Activation of the flashers shall be independent of the detection of a fire condition by the sensing element.

Each flasher shall have its own microcomputer to handle loop communications, which along with all other associated electronic components will be hermetically sealed to provide protection from hostile operating environments.

2.07 (h) DUAL ANGLE OPTICAL/HEAT DETECTOR WITH INTEGRAL SOUNDER

Install as shown in the drawings .These shall comply with the requirements of EN 54: Part 3,5 & 7.

The sensor element of the dual angle optical/heat detector sounder shall be as per the specification for the dual angle optical/heat detector.

The sounder element of the dual angle optical/heat detector shall be as per the specification for the optical smoke detector with integral sounder.

It shall be possible to connect a maximum of 80 combined dual angle optical/heat detector sounder to a detection loop.

2.07 (i) DUAL ANGLE OPTICAL/HEAT DETECTOR WITH INTEGRAL SPEECH SOUNDER.

Install as shown in the drawings .These shall comply with the requirements of EN 54: Part 3,5 & 7.

The sensor element of the dual angle optical/heat detector with speech shall be as per the specification for the dual angle optical/heat detector.

The speech function shall be provided by stored messages on a non-volatile flash memory component. Output from the flash memory processor shall be up to 25 seconds of speech. Additionally there shall be the capability to provide complex tones, such as bell and DIN tones. Each device shall include 5 standard messages in 5 languages within the flash memory component. At least 4 signal parts (consisting of tones and speech) shall be set into one signal-set. At least 2 signal sets can be programmed for 2 different events, e.g. evacuation and alert.

In addition to the voice messages above, an 8 Inch solenoid bell recording shall be provided as a standard complex tone.

All speech outputs shall be synchronised with all other loop powered sensor speech devices and other loop powered audible visual units on the panel.

It shall be possible to connect a maximum of 32 combined dual angle optical/heat detector strobes with sounder speech to a detection loop.

2.07 (j) DUAL ANGLE OPTICAL/HEAT DETECTOR WITH INTEGRAL FLASHER AND SPEECH SOUNDER.

Install as shown in the drawings .These shall comply with the requirements of EN 54: Part 3,5 & 7.

The sensor element of the dual angle optical/heat detector with Flasher and Speech sounder shall be as per the specification for the dual angle optical/heat sensor.

The sounder element of the dual angle optical/heat detector with Flasher and Speech sounder shall be as per the specification for the dual angel optical/heat sensor sounder.

The integral strobe element of the dual angle optical/heat detector with Flasher and Speech sounder shall be as per the specification for the dual angel optical/heat sensor strobe.

The speech function shall be provided by stored messages on a non-volatile flash memory component. Output from the flash memory processor shall be up to 25 seconds of speech. Additionally there shall be the capability to provide complex tones, such as bell and DIN tones. Each device shall include 5 standard messages in 5 languages within the flash memory component. At least 4 signal parts (consisting of tones and speech) can be set into one signal-set. At least 2 signal sets can be programmed for 2 different events, e.g. evacuation and alert.

As standard, the microprocessor shall contain the following messages:

| | |
|--------------------------------------------|---------------------------------------------------------------------------------------------|
| Evacuation: Alarm Message 1 (Voice) | “This is a fire alarm. Please leave the building immediately by nearest availabe exit” |
| Evacuation: (Voice) | “Attention please” |
| Evacuation Alarm Message 2: (Voice) | “This is an emergency. Please leave the building immediately by the nearest available exit” |
| Alert Message | “ An incident has been reported in the building. Please await further instructions” |
| Clear Message: (Voice) | “The emergency is now cancelled. We apologise for any inconvenience” |
| Test Message | “This is a test message, no action is required” |

All the voice messages shall be synchronised across the detection loops by means of a regular synchronisation signal generated by the fire alarm control panel. In addition to the voice messages above, an 8 Inch solenoid bell recording shall be provided as a

standard complex tone. All speech outputs shall be synchronised with all other loop powered sensor speech devices and other loop powered audible visual units on the panel. It shall be possible to connect a maximum of 32 combined dual angle optical/heat detector strobes with sounder speech to a detection loop.

2.07 (k) DUCT MOUNTED SENSORS

Venturi principle air duct detector kit shall be used. The kit with IP 54 protection ABS plastic with filters shall be mounted outside airducts. The venturi tube dips into the airduct. The airspeed in the duct shall not exceed 1 m/s to max 20 m/s. This device shall employ the aforementioned Optical/Heat detector to provide environmental information. Probes are fitted to pick up smoke in ventilation ducts. This unit is particularly suitable for sensing smoke particles in ducting which is likely to be in large quantity and flowing fairly quickly.

2.07 (l) MANUAL CALL POINTS

Install as shown in the drawings. The manual initiation devices shall be electrically compatible with all of the aforementioned detector types and shall be complete with all- electronic components and circuitry for an automatic safe addressable device. The manual call point shall have an inbuilt short circuit isolator and an inbuilt microprocessor to ensure a response time of less than 1 second.

The MCP unit shall also handle all communication to the control panel. All electronic devices contained within the MCP shall be hermetically sealed so as to prevent damage from hostile environment conditions: e.g dust with minimum rating of IP43.

The MCP operating voltage shall be 8-42 volts DC, RED similar to RAL 3020. If the MCP are located in public areas a transparent cover shall be provided as a protection to prevent inadvertent activation. MCP shall be available in two designs Large & small for aesthetic purposes to architects.

The MCP shall have an input facility to connect conventional devices. It should have an option of using either frangible glass allowing for complete removal upon operation or plastic pane resettable function. There shall be no text but SYMBOLS on the MCP (burning house / press to break).

The device can be tested functionally without the need to either remove the front cover and/or breaking the glass, with a special test key (supplied as standard). The key shall insert the underside of the MCP ensuring easy access of the key at all times.

These devices will comply fully with EN 54 part 1.

2.07 (j) Linear Heat Detector Module & sensor cable

Line heat detector module enable early detection of fires & over heating. This should be specifically designed in narrow rooms, cable alleys & rough ambient condition. This should consist of evaluation unit & sensor cable. The sensor cable shall be connected into evaluation unit. Maximum sensor cable length connected to evaluation unit shall be 300 mtrs. Unit shall monitor the resistance of sensor cable. The operating voltage of the unit shall be 9-30V. The evaluation unit need to be connected with main fire Panel. It should be Vds approved as per EN 54-5A1.

2.08 FIELD ALARM DEVICES

Electronic sounders, combined sounder/strobe and standalone strobes shall be loop powered for direct connection to the 2 core detection loop shall be electrically compatible with all initiation devices. These wall mounted units shall be available in red or white and suitable for both indoor and outdoor applications with an ingress protection rating of IP31 and IP65 respectively.

All electronic sounders, sounder/strobe and strobe only versions shall have alarm signals synchronised across all the detection loops of the fire alarm control panel.

All alarm devices shall have a short circuit isolation device provided as an integral component of the device.

All sounders shall have a 'soft start' feature controlled by the fire alarm panel, whereby a low initial volume can be set and then increased at a defined rate upto a maximum volume setting.

All alarm devices shall be provided by the same manufacturer of the control system. No other make of detectors will be permissible The Fire alarm manufacturer shall have the complete range of following alarm devices with built in short circuit line isolators so as to meet the specific applications of the site.

- a) Addressable Sounder / Flasher

2.08 (a) ADDRESSABLE SOUNDER / FLASHER

A combined electronic sounder and flasher shall be capable of providing a minimum sound level of 97dBA \pm 2dBA @ 1 metre.

The sounder shall be capable of providing 4 different sound signals which are selected/configured from 19 tone types store in the device.

The unit shall have its own microprocessor to handle loop communications and monitoring of the internal flasher element for faults in both the quiescent and alarm conditions. The microprocessor shall also monitor the sound producing element during an alarm condition to ensure that faulty devices can be automatically identified during the weekly test procedure.

All associated electronic components shall be hermetically sealed to provide protection from hostile operating environments.

The frequency of the electronic flasher light output shall be 1Hz

The unit shall be manufactured from ABS plastic with a polycarbonate lens. Body and lens colour shall be Red body / red lens.

These devices shall allow for direct connection to the detection loop. It shall be possible to connect upto 32 combined electronic sounder/flasher to each detection loop of the fire alarm control panel.

2.09 FIELD INTERFACE TRANSPONDERS

These devices shall be directly connected to the loop, four variants shall be available as standard, these being:

- (i) 4 In / 2 Out interface unit
- (ii) 1 In interface unit
- (iii) 32 LED output interface unit
- (iv) 12 Relay output Interface unit.

These units shall be self-contained wall mountable units, similar in finish to the main control panel.

(i) 4 In / 2 Out interface unit

Interface units shall be capable of accepting 4 input signals, 2 output signals. Dependent upon the specific application, input signals may be interpreted by the system as any of the following:

- Fire signal input
- Fault signal input
- Supervisory signal input
- Event signal input

The exact nature of which shall be selected by means of the commissioning software. These units will accept and or supply clean contact signals either normally open or normally closed (configurable) OR switched voltage inputs from conventional detectors or MCP's.

The output contacts shall be rated at 30V / 1 amp. DC output of the unit shall be provided with single pole change over contacts for control of plant, door release units or power output to drive conventional bells, sounders etc. Both the outputs on the interface shall be individually programmable. External power supply 12V / 24 VDC shall be provided to this unit

As with other outstations previously mentioned, interface units will contain local processing in order to handle all signalling and loop communications. Product shall be approved by VdS.

(iv) **12-Relay output interface units**

These interface units contain 12 clean relays which are individually programmable with the commissioning software. All relays can be configured as NO or NC.

As with other outstations previously mentioned, interface units will contain local processing in order to handle all signalling and loop communications.

2.10 NETWORKING OF CONTROL PANELS

It shall be possible to network connect up to 31 controls as a secure network connection. All messages from a panel should be transmitted in both direction on the ring structure. Any wire-break or short-circuit on the ring shall not effect data transmission. The network shall be configurable so that single panels, groups of panels or all panels on the network operate the same site configured cause and effect fire plan.

The network shall also be configured to allow master control from any one of the control panels on the network. To cover longer distance repeaters or fibre optical cable and converters can be used between two panels.

The network shall be able to accommodate intruder alarm panels.

There shall be extensive diagnostic functions on the panel to be used to localise faults caused by interference or wiring, Networking shall be capable of carrying out using a data cable e.g IBM type 1 or CAT5. The distance between each panel shall be standard 1200 meters and capable of extending upto 3000 meters using booster repeaters.

2.11 NETWORKED LCD OPERATING PANELS / REPEATER PANELS

The Repeat Panel shall be sited at the Rear Entrance, guard house or location where it is manned 24 hrs.. It shall provide system repeat facilities to repeat all of the liquid crystal display messages as well as the common indications. Repeat panel shall be interfaced for network fire alarm control panels, designed for standardised display and operation as per DIN EN 54 part 2 and DIN VDE 0833 part 2. Installation and connection to FACP shall be via the short circuit and open circuit resistant essernet. System network. RS 485 interface or TTY interface for connecting remote printers, and fire brigade shall be available. The repeaters shall have minimum three common relays freely programmable, monitored, potential free upto 24 VDC.

2.12 BATTERIES :

Batteries shall be provided and shall be the dry sealed lead-acid type. The batteries shall have ample capacity. With primary power disconnected, to operate the fire alarm system for a period of 24 hours with an optional 72 hours battery backup. Following this period of operation via batteries. The

batteries shall have ample capacity to operate all components of the system, including all alarm signalling devices in the total alarm mode for a minimum period of 30 minutes.

2.13 WIRING

All cables associated with Fire Alarm installation shall be of fire resistant 2 core 1.5 sq. mm twisted pair . Cables shall comply with BS 6207 Part 1. The cable is to BS 6207: Part 1 having, Typically no more than 2 cores each core having 1.5 sq. mm cross sectional area, A red cover sheath (preferred for alarm applications), Having continuous metal sheath encapsulation, Fire resistant tested to BS6387 categories CWZ.

3.0 PART 3 - EXECUTION

3.01 INSTALLATIONS

The entire fire alarm system shall be installed in accordance with DIN / BS EN54/NFPA Standards and manufacturer's approved shop drawings, written instructions and recommendations.

3.02 TESTING

Fire alarm system shall be tested in accordance to Local Civil Defence regulations and put into operation by the manufacturer or his authorized representative in the presence of engineer. Fault and alarm conditions shall be simulated and all data and alarm indicators checked with full events recorded on system printer according to the testing procedure.

LIST OF PREFERRED MAKES

| S.NO | SUBJECT | APPROVED MAKE |
|-------------|-----------------------|-------------------------------------------------------------|
| 1 | FIRE AALRM PANEL | ESSER(HONEYWELL), FIRE FINDER, NOTIFIER(USA), FANWELL |
| 2 | ADDRESSABLE DETECTORS | ESSER(HONEYWELL), FIRE FINDER, SIMPLEX, FANWELL |
| 3 | MODULES/ MCP | ESSER(HONEYWELL), FIRE FINDER, SIMPLEX, FANWELL |
| 4 | TRANSPONDER/MODULES | ESSER(HONEYWELL), FIRE FINDER, SIMPLEX, FANWELL |
| 5 | RESPONSE INDICATOR | AS APPROVES BY CONSULTANT/CLIENT |
| 6 | CABLE | |
| 7 | CONDUIT | |
| | | |
| | | |

----- END OF SECTION -----

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|----------------------------------------------------------------------------------------|
| SCHEDULE OF QUANTITIES FOR ADDRESSABLE FIRE ALARM & VOICE EVACUATION SYSTEM |
|----------------------------------------------------------------------------------------|

| S.No. | Description | Qty | Unit | Rate | Amount |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|------|--------|
| 1 | Supply, Installation, Testing & Commissioning of Microprocessor based 4 loop fire alarm control panel fully networkable, expandable with each loop capable of taking 120 devices with expandable feature, 8 line x 40 character alpha-numeric liquid crystal display. The panel shall be soft addressable type. The Panel should be able to store 10,000 log events in its Memory. The panel shall be able to give pin point location of all fire/fault conditions. Further, the panel must be able to automatically switch off respective control switches when ever any alarm is triggered. The panel shall have in built rectifier, Loop cards, L C D unit to indicate Fire/Fault Signal with address and analog output, option of built in printer to log all fire or fault events complete in all respects, integral SMF lead acid batteries with sealed cells of 24 V capable of running for a minimum of 8 hours with integral battery charger complete as required and as per specification VDS & CNBOP approved. | 1 | Each | | |
| 2 | Supply, Installation, Testing & Commissioning of Repeater Panel with 8 line X 40 characters alpha numeric LCD display with all commands such as reset, mute, silence complete as required | 1 | Each | | |
| 3 | Supply, Installation, Testing & Commissioning of Analog Addressable Intelligent multisensor detector, with decentralize intelligence, soft addressable Photo thermal (Dual Optical with Forward and backward scattering & One Thermal Chambers) type, decentralize intelligence with inbuilt fault isolator as per NFPA style 7 wiring complete with base as required | 50 | Each | | |

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|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------|--|--|
| | | | | | |
| 4 | Supply, Installation, Testing & Commissioning of Analogue Addressable Intelligent multisensor detector, with decentralize intelligence, soft addressable photo thermal type with two inbuilt optical smoke sensors with backward & forward scattering light angles as well as additional heat detector sensor, photo thermal type with inbuilt fault isolator, sounder and flasher with speech complete with base as required. | 3 | Each | | |
| | | | | | |
| 5 | Supply, Installation, Testing & Commissioning of Analogue Addressable Intelligent heat detector with decentralize intelligence, soft addressable type with inbuilt fault isolator complete with base as required. | RO | | | |
| | | | | | |
| 6 | Supply, Installation, Testing & Commissioning of Analog Addressable Intelligent multisensor detector, with decentralize intelligence, soft addressable Photo thermal (With Infra blue LED instead of Infrared inside the detector for early detection) with inbuilt fault isolator for server room/telecom room/ computer room complete with base as required | 2 | | | |
| | | | | | |
| 7 | Supply, Installation, Testing & Commissioning of Addressable Manual Call Point soft addressable type with inbuilt fault isolator complete as required. | 5 | | | |
| | | | | | |
| 8 | Analogue Automatic Addressable DUCT Detector with multicriteria Detector with advanced decentralized intelligence, CPU failure mode, alarm & operating data memory inbuilt short circuit line isolator. This shoould include all venturi tubes etc with all acessories complete as required | 1 | | | |
| | | | | | |
| 9 | Supply, Installation, Testing & Commissioning of Analog Addressable Intelligent optical smoke detector, with decentralize intelligence, soft addressable with inbuilt fault isolator complete with base as required | RO | | | |
| | | | | | |
| | | | | | |
| 10 | Supply, Installation, Testing & Commissioning of Addressable transponder/ Control Modules 1 output for controlling AHU/Lifts etc complete as required. | 1 | | | |
| | | | | | |

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|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|--|--|--|
| 11 | Supply, Installation, Testing & Commissioning of Addressable siren with high intensity having range of 1 km for out door application etc complete as required. | 1 | | | |
| | | | | | |
| Conduiting & Cabling. | | | | | |
| | | | | | |
| 12 | Supply and fixing of 20 mm MS Conduits including all accessories complete as required. | 600 | | | |
| | | | | | |
| 13 | Supply and fixing of 25 mm MS Conduits including all accessories complete as required. | 50 | | | |
| | | | | | |
| 14 | Supply and pulling of 2 x 1.5 sq.mm copper FRLS cable in existing MS conduits. | 750 | | | |
| | | | | | |