

SECTION 28 31 10  
FIRE ALARM SYSTEM  
PART 1 - GENERAL  
1.01 DESCRIPTION

- A. Work Includes:
- The contractor shall furnish and install a complete 24 VDC, electrically supervised, conventional / addressable fire alarm system as specified herein and indicated on the drawings. The system shall include but not be limited to all control panels, power supplies, initiating devices, audible and visual notification appliances, alarm devices, and all accessories required to provide a complete operating fire alarm system.
  - Submit Drawings and receive approval from the Landlord and the Local Fire Prevention Bureau.

1.02 QUALITY ASSURANCE

- A. The entire fire alarm system shall meet or exceed all State and/or Local Codes and ordinances.
- B. Fire alarm system shall be in compliance with the following:
- National Electrical Code (NEC)
  - NFPA Standards No. 70, 72, 101
  - Americans With Disabilities Act (ADA)
  - Village of Anywhere USA Fire Prevention Bureau.
  - International Building Code.
  - International fire code
- C. All equipment furnished for this project shall be new and unused. All components shall be designed for uninterrupted duty. All equipment, materials, accessories, devices and other facilities covered by this specification or noted on the contract drawings and installation specification shall be best suited for the intended use and shall be provided by a single manufacturer. If any of the equipment provided under this specification is provided by different manufacturers, then that equipment shall be "Listed" as to its compatibility by Underwriters Laboratories (UL), if such compatibility is required by UL standards.

1.03 REQUIREMENTS OF REGULATORY AGENCIES:

- A. Furnish a conduit and wiring riser diagram of the fire alarm system and service equipment as installed in the tenant remodeled spaces.

1.04 MANUFACTURER'S SERVICES:

- A. The following supervision of installation shall be provided by a trained service technician from the manufacturer of the fire alarm equipment. The technician shall be U.L. certified and have had a minimum of two(2) years of service experience in the fire alarm industry.
- B. The manufacturer's service technician shall be responsible for the following items:
- Pre-installation visit to the job site to review equipment submittals and verify method by which the system should be wired.
  - During job progress make periodic job site visits to verify installation and wiring of system.
  - Upon completion of wiring, final connections shall be made under the supervision of this technician and final checkout and certification of the system.
  - At the time of final checkout, technician shall give operational instructions to the electrician, landlord and construction manager as well as any Urban Outfitter representative.

1.05 SUBMITTALS

- A. Shop drawings for the complete fire alarm system shall be submitted for approval.
- B. Shop drawings shall include the following data:
- Catalog Data: Manufacturer's literature and illustrations.
  - Dimensions of equipment.
  - Complete wiring diagrams. Including point to point Wiring diagrams.
  - Manufacturer's installation and operation instructions.
  - Battery calculations for system.
  - Method of Operation document.
  - Voltage drop calculations.

1.06 SYSTEM OPERATION

- A. The act of manually operating a manual station or the automatic operation of a thermodelector, smoke detector, or water flow switch shall cause the following:
- Visually indicate at the fire alarm control/annunciator panel the area zone initiating the alarm.
  - The fire alarm control panel shall indicate both trouble and/or alarm conditions by zone.
  - Continuously sound all fire alarm audible and visual devices connected to the system until the system has been restored to normal.
  - Automatically shut down air handling units, as indicated on the Drawings.
  - Automatically disengage all magnetic door holders.
  - be arranged to transmit a fire alarm or trouble condition automatically to the fire station or Central monitoring system.
  - The general alarm devices may be silenced by entering a locked control cabinet and operating the proper silence switch. Operation of this switch shall be indicated by a trouble light and audible signal within three seconds. The General Alarm and the annunciator(s) should light and the LCD should prompt the user as to the current events. The alarm information must be stored in event memory for later review. When the alarmed device is restored to normal, the control panel shall be required to be manually reset to clear the alarm condition, except that zone alarms may be silenced as programmed. An alarm shall be silenced by the silenced button at the main or by using a code and a button on the remote annunciators. When silenced, this shall not prevent the sounding of subsequent events if another event should occur (subsequent alarm feature). When alarms are silenced the trouble LED on the control panel, and on any remote annunciators shall remain lit until the alarmed device is returned to normal.

- C. When a device indicates a trouble condition, the control panel System Trouble LED should light and the LCD should prompt the user as to the current events. The trouble information must be stored in event memory for later review. When the device in trouble is restored to normal, the control panel shall be automatically reset. The trouble restore information must be stored in event memory for later review. Pushing the silence button at the main control or entering a code and pushing the silence button on the remote annunciators shall silence a trouble. When silenced, this shall not prevent the resounding of subsequent events if another event should occur.
- D. Each multiplex buss loop shall be electrically supervised for opens and ground faults in the circuit wiring, and shall be so arranged that a fault condition on any loop will not cause an alarm to sound. Additionally, every addressable device connected to the multiplex buss will be supervised and individually identified if in a fault condition. The occurrence of any fault will light a trouble LED and sound the system trouble sounder, but will not interfere with the proper operation of any circuit which does not have a fault condition. Each indicating appliance circuit shall be electrically supervised for opens, grounds and short circuit faults, on the circuit wiring, and shall be so arranged that a fault condition on any indicating appliance circuit or group of circuits will not cause an alarm to sound. The occurrence of any fault will light the trouble LED and sound the system trouble sounder, but will not interfere with the proper operation of any circuit which does not have a fault condition.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Fire Alarm Control Panel; New
- The FACP must be capable of expansion to a maximum of 16 total amps via bus connected expander modules that supervise low battery, loss of AC and loss of communication.
  - The FACP must be capable of supporting up to eight (8) conventional fire zones and 247 addressable points. Each multiplex buss shall be capable of supporting a maximum of 128 devices each. The communication protocol on the multiplex buss loop must be digital.
  - The panel must have a built in 32 character LCD annunciator/ keypad with the capability of having an additional four supervised remote annunciators/keypads connected in the field.
  - The FACP must have a built in UL approved digital communicator. The communicator must allow local and remote up/downloading of system operating options, event history, and detector sensitivity data for addressable detectors.
  - The main communication bus shall be capable of Class A or Class B configuration with a total bus length of 5,900 feet (1,798 m).
  - The multiplex buss and Data Communication Bus (optional bus) shall be wired with standard NEC 760 compliant wiring, non-shielded or mid capacitance wiring is required for standard installation. All FACP screw terminals shall be capable of accepting 14 AWG (1.6 mm) to 18 AWG (1.2 mm) wire. All system wiring shall be in accordance with the requirements of NFPA 70, the National Electrical Code (NEC), and also comply with article 760 of the NEC.
  - Power Limited Wiring: for Power Limited wiring, use FPL or FPLP approved wiring.
  - Annunciator: the main control must have a built in annunciator with a 32 character LCD display and feature LED's for General alarm, System trouble, System Silence and Power.
  - The annunciator must be able to silence and reset alarms through the use of a keypad entered code or by depressing the desired function key, depending on how the system is configured. The annunciators must have an event history feature that will allow the limitation of operating system programming to authorized individuals.
  - The digital communicator must be an integral part of the control panel and be capable of reporting all points and all zones of alarm, supervisory, and trouble as well as all system status information such as loss of AC, low battery, ground fault, loss of supervision and any remote devices with individual and distinct messages to a central station or remote station. The communicator must also be capable of up/downloading of all system programming options, Event history and Sensitivity compliance information to a PC on site or at a remote location.
  - The FACP will have two form "C" dry contacts that can be programmed for alarm, trouble notification, water flow, and supervisory.
  - A ground fault detection circuit shall be provided to detect positive and negative grounds on all field wiring. The ground fault detector shall operate the general trouble devices as specified but shall not cause an alarm to be sounded. A single ground fault will not interfere with the normal operation, such as alarm, or other trouble conditions.
  - All low voltage circuits will be protected by microprocessor controlled circuit breakers or has a self restoring circuit breaker for the following: smoke detector power, main power supply, indicating appliance circuits, battery standby power and auxiliary output.

2.02 SPRINKLER SYSTEM

- A. Power Supply and Charger: The entire system shall operate on 24 VDC power supply with the rated current available of 4 Amps. The FACP must have a battery charging circuit capable of complying with the following requirements: a. (60) hours of battery standby with five (5) minutes of alarm signaling at the end of this sixty (60) hour period (as required per NFPA 72 remote station signaling requirements) using rechargeable batteries with automatic charger to maintain standby sealed lead-acid batteries in a fully charged condition. The power supply shall comply with UL Standard 864 for power limiting. The FACP will indicate a trouble condition if there is a loss of AC power or if the batteries are missing or of insufficient capacity to support proper system operation in the event of AC failure. A "Battery Test" will be performed automatically every three minutes to check the integrity of the batteries. The test must disconnect the batteries from the charging circuit and place a load on the battery to verify the battery condition. In the event that it is necessary to provide additional power one or more of the model D7035 Distributed Modules shall be used to accomplish this purpose.
- C. Signal Initiating Devices; furnish and install signal initiating devices as shown on the Drawings.
- D. Thermodelectors 135' RR & FT
- E. Smoke Detectors with addressable base. Provide smoke detectors with auxiliary contacts as required.
- F. The detector shall be UL listed compatible with the fire alarm control panel. The smoke detector shall have a flashing status LED for visual supervision. When the detector is actuated, the flashing LED will latch on solid. The LED shall flash at a 1/sec rate if the chamber is out of calibration range. The detector may be reset by actuating the control panel's reset switch. The vandal security-locking feature shall be used in those areas as indicated on the drawing. The locking feature shall be field selectable when power is present. All detectors shall have the "Chamber Check" feature with the addressable detectors sending a contaminated chamber signal to the FACP.
- F. Manual Fire Alarm Stations shall be non-coded, break-glass, double action type, with a key operated test-reset lock in original position. They may be tested, and so designed that after actual Emergency Operation they cannot be restored to normal except by use of a key. An operated station shall automatically condition itself so as to be visually detected, as operating at a minimum distance of fifty feet, front or rear. Manual Stations shall be constructed of die cast metal with clearly visible operating instructions on the front of the stations in raised letters. Stations shall be suitable for surface mounting on metal back box, or semi-flush mounting on standard single-gang box, and shall be field adjustable within the limits defined by the Americans with Disabilities Act (ADA) and American National Standards Institute (ANSI) per local requirements.
- G. Photoelectric Smoke Detectors shall be furnished preinstalled in roof to units and wired to electrical control. Interface with fire alarm system through a non-addressable interface module.
- H. Water flow and tamper switches are to be furnished under another Section but wired by this Contractor and provided with addressable monitor modules. Provide and install visual devices in all public use areas and in non-public areas, such as work areas and as indicated on the drawings. The visible and audible/visible signal shall be Bosch Multi-candela signal devices with field selectable settings of 15, 30, 75, 110cd and be listed by Underwriters Laboratories Inc.
- J. The notification appliance (combination audible/visible units only) shall produce a peak sound output of 90dba or greater as measured in an anechoic chamber. The signaling appliance shall also have the capability to silence the audible signal while leaving the visible signal energized with the use of a single pair of wires. All visual devices shall be synchronized. The visible signaling appliance shall maintain a minimum flash rate of 1 Hz or greater regardless of power input voltage. The appliance shall meet the candela requirements of the blueprints presented by the Engineer and ADA.
- L. The appliance shall be polarized to allow for electrical supervision of the system wiring. The unit shall be provided with terminals with barriers for input/output wiring and be able to mount to a single gang or double gang box or double workbox with the use of an adapter plate. The unit shall have an input voltage range of 16 - 33 Volts with either direct current or full wave rectified power.
- M. Furnish and install as shown on the Drawings, slow fan shutdown relays.
- N. Magnetic Door Holders - Furnish and install as shown on the Drawings, semi-flush wall mounted magnetic door holders. Where wall unit is not possible to install, furnish and install closure mounted on door(s) frame.

PART 3 EXECUTION

3.01 SYSTEM WIRING

- A. All final connections shall be made under direct supervision of Manufacturer's factory engineer. After final checkout, Owner's personnel shall be verbally instructed in use and operation of system, and shall be provided with four(4) copies of written instructions.
- B. Color Coding: For fire alarm system shall match existing Building standards.
- C. Prepare conduit and wiring risers, (point to point) for construction and records. Submit to municipality Fire Prevention Bureau and Landlord for approval prior to start of any work.
- D. The installer shall coordinate the installation of the fire alarm equipment.
- E. All conductors and wiring shall be installed according to the manufacturer's recommendations. It shall be the installer's responsibility to coordinate with the supplier, regarding the correct wiring procedures before installing any conduits or conductors.
- F. System components shall be installed in accordance with the latest revision of the appropriate NFPA pamphlets, the requirements outlined herein, National Electrical Code, local and state regulations, the requirements of the fire department and other applicable codes (including radiation (part)).
- G. All wire used on the fire alarm system shall be UL listed as fire alarm protection signaling circuit cable per National Electrical Code, Article 760. The use of FPL, FPLP or PLP wiring is power limited applications.

3.02 WARRANTY & FINAL TEST

- The contractor shall warrant all equipment and wiring free from inherent mechanical and electrical defects for one year (365 days) from the date of final acceptance.
- B. Before the installation shall be considered completed and acceptable by the awarding authority a test of the system shall be performed as follows: The contractor's job foreman, a representative of the owner, and the fire department shall operate every building fire alarm device to ensure proper operation and correct annunciation at the control panel.
- At least one half of all tests shall be performed on battery standby power.
  - Where application of heat would destroy any detector, it may be manually activated.
- C. The communication loops and the indicating appliance circuits shall be opened in at least two (2) locations per circuit to check for the presence of correct supervision circuitry.
- D. When the testing has been completed to the satisfaction of both the contractor's job foreman and construction manager, a notarized letter cosigned by each attesting to the satisfactory completion of said testing shall be forwarded to the owner and the fire department.
- E. The contractor shall leave the fire alarm system in proper working order, and, without additional expense to the owner, shall replace any defective materials or equipment provided by him under this contract within one year (365 days) from the date of final acceptance by the awarding authority. Prior to final test, the fire department must be notified in accordance with local requirements.
- F. DRAWINGS, TESTING, AND MAINTENANCE INSTRUCTIONS
- A. A complete set of reproducible "as-built" drawings showing installed wiring, color coding, and wire tag notations for exact locations of all installed equipment, specific interconnections between all equipment, and internal wiring of the equipment shall be delivered to the owner upon completion of system.
- B. Operating and instruction manuals shall be submitted prior to testing of the system. Three (3) complete sets of operating and instruction manuals shall be delivered to the owner upon completion. User operating instructions shall be provided prominently displayed on a separate sheet located next to the control unit in accordance with UL Standard 864.

3.03 AS BUILT

- A. A complete set of reproducible "as-built" drawings showing installed wiring, color coding, and wire tag notations for exact locations of all installed equipment, specific interconnections between all equipment, and internal wiring of the equipment shall be delivered to the owner upon completion of system.
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