

DIVISION 28 – ELECTRICAL

283111.01 - FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. The work required under this section of the specifications consists of the furnishing, installation and connection of the Fire Alarm System - Low Rise Multiplexed.
- B. Definition: The Fire Alarm System consists of an addressable control panel with alarm initiating devices as indicated on the plans for the Belt Press Building and a limited panel for elevator in main building.

1.3 QUALITY ASSURANCE

- A. Industry Referenced Standards: The following specifications and standards are incorporated into and become a part of the specification by reference.
 - 1. Underwriter's Laboratories, Inc. (UL) Publications:
 - a. No. 38: Manually actuated signaling box for use with Fire Protective Signaling Systems.
 - 2. National Electrical Manufacturer's Association (NEMA) Publications:
 - a. No. SB3: Interconnection Circuitry of Non-Coded Remote-Station Protective Signaling Systems.
 - 3. National Fire Protection Association (NFPA):
 - a. No. 70: National Electrical Code (NEC)
 - b. No. 72A: Local Protective Signaling Systems
- B. Acceptable Manufacturers: Products of the following manufacturers which comply with these specifications are acceptable.
 - 1. Edwards Division; EST
 - 2. Johnson Controls, Inc.
 - 3. Notifier
 - 4. Simplex
- C. Coordination:

1. Review shop drawings submitted under this and other sections, as well as other divisions, to insure coordination between work required among different trades. Coordinate the installation sequence with other contractors to avoid conflicts and to provide the fastest overall installation schedule. Coordinate installation with architectural and structural features, equipment installed under other sections of the specifications, and electrical equipment to insure access and so that clearance minimums are provided.
- D. Installer's Qualifications: Firm with at least 5 years of successful installation experience on projects with fire alarm systems work similar to that required for this project.
1. Firm with manufacturer's factory trained personnel.
 2. Firm with factory authorized service organization and spare parts stock.

1.4 SUBMITTALS

- A. Refer to BASIC ELECTRICAL REQUIREMENTS section for submittal requirements.
- B. Product Data: Submit manufacturer's technical product data, including specifications and installation instructions, for each type of fire alarm system equipment. Include standard or typical riser and wiring diagrams, and operation and maintenance instructions for inclusion in maintenance manuals.
- C. Wiring Diagrams: Submit dimensioned floor plan drawings (minimum 1/16 inch scale) for each floor plan indicating all device locations with corresponding zone next to device. Zoning shall include initiation and audio zone where applicable. Plans shall include all conduit and wiring requirements indicating system interconnection, number and size of conductors and appropriate conduit size, and ancillary devices such as end-of-line resistors. Include wiring and riser diagrams.
- D. Isometric Detail: Provide isometric detail for Fire Alarm Control Panel indicating all component features and space requirements.
- E. Maintenance Data: Submit maintenance data and parts lists for each type of fire alarm equipment installed, including furnished specialties and accessories. Include this data, product data, and shop drawings in maintenance manual; in accordance with requirements of Division 1.
- F. Manufacturer Certification: Submit a letter from the manufacturer's representative stating the proposed system being submitted for review complies with the specification and takes no exception.

1.5 DELIVERY, STORAGE, AND HANDLING:

- A. Handle fire alarm equipment carefully to prevent damage, breaking, and scoring. Do not install damaged equipment or components; replace with new.
- B. Store fire alarm equipment in clean, dry place. Protect from weather, dirt, fumes, water, construction debris, and physical damage.

PART 2 - PRODUCTS

2.1 FIRE ALARM AND DETECTION SYSTEMS:

- A. General: Provide complete fire alarm system products of types, sizes, and capacities indicated, which comply with manufacturer's standard design, materials, components; construct in accordance with published product information, and as required for complete installation. Provide fire alarm and detection systems for applications indicated.
 - 1. Combination, Non-Coded: Either manual activation of fire alarm station or activation of automatic initiating device will energize fire alarm system signaling devices and sound non-coded alarm.
- B. Design system for alarm sounding continuously throughout facility.
- C. System Wiring and Supervision:
 - 1. Provide Class 1 initiating and alarm circuits with electrical supervision for shorts and open conditions.
 - 2. Install diodes or resistors in fire alarm control cabinet.
 - 3. Power Supplies: Provide system for operation on 120 VAC power supply. Arrange control system for operation of primary power supply and trouble power supply to operate from opposite legs of three wire system.
 - 4. Provide battery back-up as secondary power supply. Design battery back-up to take over supply to system within 30 seconds of loss of primary system to 85% voltage. Provide battery system capable of operation of system for 24-hours under normal conditions and then for five minutes under alarm conditions.
- D. Optional System Features: Provide the following features in addition to the basic system features specified elsewhere in this specification
 - 1. Auxiliary contacts, normally open. Provide one contact for annunciation to SCADA system for alarm and trouble for all systems.
- E. System Materials: Provide basic wiring materials which comply with Division 16 Basic Electrical Materials and Methods sections, RACEWAYS and BOXES, types to be selected by Installer.

1. Provide conductors which are listed and approved for fire alarm usage. All wiring shall be installed in conduit. Minimum size conduit shall be 3/4".

2.2 SYSTEM OPERATION

- A. Actuation of any alarm initiation device shall automatically initiate the following:
 1. Illuminate the system priority one alarm LED, cause an audible alarm signal to sound, display the alarm condition language message for the point in alarm at the Central Control Station.
 2. Cause all alarms to sound, all visual alarms (including exit light) to flash.
 3. Provide a signal for connection to the SCADA panel.
- B. The fire alerting tone shall be a low to high "slow whoop" from 200 Hz to 830 Hz nominal lasting 2.5 seconds.
- C. It shall be possible to silence the alarm signals by operating the acknowledge switch causing the zone alarm LED to cease flashing and remain illuminated. However, the activation of another zone shall repeat the entire alarm process thus causing the signals to resound.

2.3 SYSTEM FEATURES

- A. The system shall include the following features as a minimum:
 1. All alarm initiating circuit wiring, signal circuit wiring, and alarm circuit wiring supervised.
 2. Automatic transfer to standby batteries upon power failure.
 3. Solid state, microprocessor based circuitry.
 4. Full supervision of all communication, monitor and signal wiring.
 5. User programmable with keyboard.
 6. Modular design to allow future expansion with a minimum of hardware additions.
 7. System automatically switches to battery operation upon loss of 60 Hz power.
 8. Operation shall not require personnel with special computer operation skills.
 9. All messages generated by the software shall be "user friendly" in plain English, not computer language. Messages shall describe condition and, based on input from the Owner, provide plain language instructions for building personnel.

2.4 FIRE ALARM PANEL

- A. Provide surface mounted fire alarm panels where shown. Panels shall include all controls and batteries to supervise and annunciate all devices.
- B. In Belt Press Building, install panel inside a NEMA 4X box with clear cover.

- C. For main building, provide limited panel feature for elevator area only.

2.5 MANUAL FIRE ALARM STATIONS

- A. Provide manufacturer's standard construction, red enclosure, manual fire alarm stations with the following features:
 1. High Impact Lexan
 2. Surface mounted
 3. Non-coded
 4. Non-breakglass operation
 5. General alarm
 6. Single action
 7. Institutional cover
- B. For Belt Press Building, all devices shall be rated NEMA 4X.

2.6 HORNS/AUDIBLE

- A. Provide manufacturer's standard construction fire alarm horn with following features:
 1. Non-coded
 2. Surface mounted (with grille)
 3. Single projection
 4. Alarm light with white lens lettered red "FIRE"
- B. For Belt Press Building, all devices shall be rated NEMA 4X.

2.7 ALARM LIGHTS

- A. Provide manufacturer's standard construction alarm lights with the following features:
 1. White lens, plain or lettered red "FIRE".
 2. 24-volt DC Xenon flasher.

2.8 SMOKE OR THERMAL DETECTORS

- A. Provide photoelectric smoke detectors or rate of rise thermal detector where shown. All to be addressable.

2.9 TEST CHART INSTRUCTIONS

- A. Provide fire alarm system test instructions chart mounted in lexan enclosed frame assembly on control cabinet hinged door.

PART 3 - EXECUTION

3.1 EXAMINATION:

- A. Examine areas and conditions under which fire alarm systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION OF BASIC IDENTIFICATION:

- A. Install electrical identification in accordance with Division-26 Basic Electrical Materials and Methods section "Electrical Identification."

3.3 INSTALLATION OF BASIC WIRING SYSTEM MATERIALS:

- A. Install wiring, raceways, and electrical boxes and fittings in accordance with Division-26 Basic Electrical Materials and Methods sections, "Raceways", "Wires and Cables", and "Boxes" for wiring of non-power limited circuits. Conduit, boxes, etc shall be painted red.
- B. Install wires and cables without splices. Make connections at terminal strips in cabinets or at equipment terminals. Make soldered splices in electronic circuits in control cabinets.

3.4 INSTALLATION OF FIRE ALARM SYSTEMS:

- A. Install fire alarm system as indicated, in accordance with equipment manufacturer's written instructions and complying with applicable portions of NEC and NECA's "Standard of Installation."
- B. Wiring: Wiring of fire alarm system is work of this section, but is not specifically detailed on drawings.
 - 1. Complete wiring in accordance with manufacturer's requirements. Color code wiring and install per manufacturer's point-to-point wiring diagram. Determine exact number of wires for each fire area zone from number and types of devices installed. Connect each device with sufficient wiring to complete its intended operation.
 - 2. Where there are a number of power requiring devices such as smoke detectors, fan relays, door holders and smoke damper operators installed in a circuit, group in numbers so power required does not exceed 80% of manufacturer's power supply rating. Provide extra wiring, or extra power supplies required to fulfill that requirement. In addition, provide extra or larger size wiring to alleviate voltage drops which makes device operate beyond voltage limits for which it was

designed. Determine above with manufacturer's representative while equipment is being installed.

3.5 FIELD QUALITY CONTROL:

- A. Connection and Supervision: Make connections to panel under manufacturer's supervision. Run wiring to main terminal cabinet located adjacent to main fire alarm panel. Complete connections from this cabinet to panel utilizing Manufacturer's technicians.
- B. System Test and Approval: Submit shop drawings for function and operation only, pre-approved by authority having local jurisdiction.
 - 1. Prior to final acceptance of system, manufacturer of system shall, in presence of Contractor, Owner's Representative and Architect's representative, test each sensing or detection and alarm device.
 - 2. Submit copy of test results in duplicate after signed by Owner's Representative to Architect, Owner, Owner's Insurance Company and local Fire Protection Authority. Mount copy of inspection record in lexan enclosed frame assembly on control panel.
- C. Upon project completion, the manufacturer's representative shall present for the Owner's consideration a proposal to provide semi-annual inspection and tests of the system.

END OF SECTION