

SECTION 16000

FIRE ALARM SYSTEM UPGRADE

PART ONE: GENERAL

- 1.01 A. The work covered by this section of the specification shall include all equipment, materials, labor, transportation, permits, inspections and incidentals required to complete all operations in connections with the installation of electrical systems as shown on the drawings and/or as herein specified. The Contractor shall assume complete responsibility for receiving, storing, handling, and installing all equipment.
- B. The general provisions of the contract, including the General Conditions, Contract Conditions, and Drawings apply to work specified in this section.

1.02 WORK SPECIFIED IN THIS SECTION

- A. Demolition of Existing Equipment
- B. Power wiring
- C. Fire Alarm System

1.03 WORK SPECIFIED ELSEWHERE

- A. Section 07920: Sealants
- B.

1.04 SCOPE OF WORK

The contractor shall provide all materials, labor, and supervision necessary to furnish and install a complete operating Fire Alarm System with associated electrical system as indicated and as necessary. The work shall include but not be limited to the following.

- A. Provide new Fire Alarm System
- B. Furnish and install duct smoke detectors for all HVAC air handling equipment.
- C. Interface with existing telephone system as indicated.
- D. Obtain and pay for all necessary permits and inspections.

1.05 CODE COMPLIANCE

- 1.05.1 All wiring shall comply with the 2011 Edition of the National Electrical Code NFPA 70, the 2007 Edition of the Life Safety Code NFPA 101, and all applicable OSHA, federal, state, and local codes. Obtain and pay for all required permits.

1.06 SUBMITTALS

1.06.1 Within 7 days of the contract award, submittals are required for the following equipment.

- a) Fire Alarm System
- b) Disconnect switches
- c) Wiring Devices
- d) Demolition Schedule and Procedures
- e) Communication / Switch Equipment

PART 2 PRODUCTS

2.01 ELECTRICAL SERVICE AND DISTRIBUTION EQUIPMENT

2.01.1 Service Entrance & Metering

Existing electrical service is 400 ampere, 208 volt, 60 hz, 3 phase, 4 wire wye service.

2.01.2 Meter Service Distribution

Existing main entrance metering shall remain.

2.02.1 Distribution Panelboards

Existing Distribution Panelboard (MDP) shall remain and reused.

2.03 WIRING MATERIALS

2.03.1 Power wire conductors shall be #12 AWG minimum with THWN/THHN insulation rated 90 degrees C. All conductors shall be copper. Type MC cable may be used for branch circuits only as long as it is well protected from damage, sharp edges, etc.. Type NM cable may not be used for powering equipment devices of voltage 120 volts or higher. Type NM cable may be used for low voltage system wiring such as fire alarm devices. All cable shall be run perpendicular to building structure. Where multi-wire branch circuits are used, wires shall be color coded to indicate the phase. The color code shall be posted at the panelboard.

All Attic HVAC Areas, Mechanical Rooms, and Electrical Equipment Rooms:

All power and low voltage wiring serving these areas shall be feed using metal conduit, EMT or rigid conduit.

2.03.2 Conduit (rigid and EMT) shall be used in designated power feeds, main equipment loads, electrical, mechanical rooms, and where indicated on the plans and where required for protection from physical damage. The conduit shall not be used as a grounding conductor.

Where flexible connections are required, such as motor connections, liquid tight flexible metal conduit shall be used for exterior, wet locations. MC cable may be used for interior flexible connections. Supplemental grounding conductors shall be used, sized by Article 250-95.

2.03.3 Except as otherwise indicated, boxes shall be metal. Where devices are installed on 4" square boxes, plaster rings shall be used. All boxes shall be of sufficient size for the conductors contained within.

2.03.4 Where telephone, data, and security cable outlets are indicated on the plans, furnish and install empty 3/4" conduit to above ceiling and 4" square box with plaster ring (where applicable), 18" above finished floor and wire from device jack back to Hub Room, or as designated.

2.03.5 Devices:

Switches shall be rated 20 ampere AC only specification grade, Leviton 5521 series or equal, side-wired, commercial grade. Where gang switch covers occur, switches shall be labeled with an approved metal name tag.

Except as otherwise indicated, Receptacles (interior) shall be rated 15 ampere 125 volt, grounding type, commercial grade. They shall be side-wired, specification grade, Leviton 8200 series or equal.

GFCI receptacles shall be Leviton Suregard #6598 or equal, with 5 milliampere trip threshold. Single receptacles shall have the same ampere rating as the circuit.

All device plates shall be brushed aluminum.

2.04 TELEPHONE SYSTEM

Existing interior analog telephone systems shall be maintained for the duration of the project. Contractor shall be responsible for maintaining dedicated phone or fax extensions during all stages of construction for the convenience of the Owner until the completion of the project. Owner shall be responsible for dedicated phone to service new fire alarm panel.

Telephone Wire: 24AWG, 6 conductor , gray color coded, category 5e area network cable. Receptacles: Panduit flush mount jack category 5e, 6 pin, UL listed metallic outlet box covers Panduit model #MEFP2, with #MMJC66 RJ11 modular jacks.

2.05 FIRE ALARM SYSTEM

a) All materials used are to be new, of commercial grade and heavy duty. The Contractor shall obtain and follow all material manufacturer warranties and written instructions.

b) All materials and product information materials shall be submitted to the Owner and Engineer in advance, for approval.

c) All components, products and software for this project shall be nonproprietary.

d) Materials shall include, but are not limited to, a fire microprocessor-based controller that offers conventional and intelligent fire detection and annunciation; access control; battery backup; motherboard with appropriate number of slots to accommodate field wiring to meet codes for the building size and required

applications with no less than one hundred and ninety-eight (198) point capability; automatic system check every twenty four (24) hours with supervision circuits that annunciate a trouble on microprocessor failure; alarm verification and trouble indication by zone and point; individual indicating zone disconnects; accommodates fire alarm requirements for elevators for each floor, the elevator machine room and car recall to main floor; meet requirements for fire/smoke detection of HVAC units and duct work; call out capability to outside locations, main unit identification panel, a lobby/main entry identification panel and all miscellaneous needed parts and components.

e) Provide fire alarm detection system along with peripherals as shown on plans. The fire alarm panel and system shall be new and all peripherals devices shall be addressable. The fire alarm system shall consist of a digital programmable type panel with future expansion capabilities and addressable point of origin peripheral capabilities, Firelite or approved equal. The following peripherals model numbers are selected around Firelite devices.

Fire alarm panel: MS-9200UDLS Rev. 2, 198 point addressable
Smoke detectors shall be the plug in type, Model SD355T.
Heat detectors shall be H355.
Audio / visual alarms: P2R / PC2R series
Visual alarms: SR / SCR series
Manual pull stations: BG-12LX series double action type
Duct smoke detectors: D355PL, photoelectric type
Monitor Modules: MMF-300
Control Module: CMF-300-6
Remote Annunciator Panel: ANN-80W

Provide and install duct type smoke detectors for supply & return air of air handling equipment supply and return air, as indicated on plan. Duct smoke detectors shall be Firelite D355PL approved equal. Provide remote reset keyed switches located in convenient for service personal.

System shall be programmed and wired such that when any device should go into alarm state, a signal to the panel shall initiate appropriate system devices.

This contractor shall provide necessary wiring for peripherals such as smoke detectors, manual pull stations, audio/visual devices, etc. to meet local and state code. All low voltage cable shall be fire rated.

Fire Alarm Remote Communications: system remote, off site, communication monitoring shall be provided via Owner's analog copper hardwire, dedicated, for fire alarm system in lieu of internet protocol type communication. Owner shall be responsible for providing dedicated telephone line. However, wired by this Contractor.

2.05.2 TRAINING:

Provide 4 hours of on site training and 2 hours of custom programming for the building Owner operators. This training shall be 'hands-on' type at the Owner's place of convenience. A mutual agreement on the scheduling of this training class will be made

between the owner and the contractor. The intent of this training is that 2 hours will occur before the owner has occupied the facility and the rest is to follow after the owner has accepted beneficial use. The training class will use the actual Operator manual that will be submitted for this project.

2.05.3 DOCUMENTATION:

Proper and adequate documentation must be provided, this will include:

- a. Accurate as-built drawings and sequences submitted in hardcopy and floppy disk form (the CD can be easily updated via a standard Computer Aided Drafting (CAD) program).
- b. Owner's manuals including technical spec sheets
- c. Operator manuals

2.05.4 Manufactures representative shall be responsible for all programming and testing of the system. Programming of processor shall consist of NFPA specified standards, minimum, along with an additional four hours for customized messages and four hours of owner operation instructions.

2.06 SPECIALTIES

2.06.1 Elevator System: Limited elevator wiring shall be provided and wired by this Contractor. Smoke detectors at each landing, in the Elevator Machine Room, and as indicated on Elevator Shaft Elevation plan shall be wired and provided to the Fire Alarm Panel as indicated. In addition, a total of three NC, dry signals from the F.A.P. wired to the Machine Room Elevator Controller shall be provided. One set shall derive from the Ground Floor smoke detector, one set derive from the Machine Room smoke detector, and the third set derive from the 1st & 2nd Floor landing smoke detectors. This Contractor shall carry costs and coordinate efforts with the Elevator Contractor, Thyssen Krupp Elevator Company. Elevator representative Terri Winslow, 207 989-3555, or 332-3680.

2.07 MOTORS

2.07 All motors shall be furnished factory-mounted on the driven equipment and shall be provided by equipment manufacturer. Mechanical Contractor shall supply all motors to associated HVAC equipment, unless otherwise noted. Electrical Contractor shall be responsible for providing motor starters, VFD's and disconnects and power wiring to all mechanical equipment including motor starters and terminating in such equipment. This Contractor and Mechanical Contractor shall coordinate such installation of electrical equipment and both shall be present when motors of 1/2 hp and larger are to be first energized.

2.07.1 Furnish and install branch circuit wiring for power to all motors. Control wiring shall be furnished by A.T.C. under this specification.

2.07.2 Furnish and install motor disconnect switches for servicing of equipment located at all motors. Disconnect switches shall be furnished with dual element time delay fuses to match NEC requirements and equipment specifications. In no case shall the maximum fuse size specified by the equipment manufacturer be exceeded.

2.07.3 Manual motor starters for fractional horsepower motors shall be General Electric CR 101 Y in NEMA 1 enclosures or flush mounted. Furnish and install overload heaters in accordance with manufacturer's nameplate.

- 2.07.4 Magnetic motor starters shall be General Electric style CR306. Starters shall be furnished with HOA selector switch. Furnish and install overload heaters in accordance with manufacturer's nameplate.
- 2.07.5 Where running conduit, equipment shall be connected to power wiring by means of flexible metal conduit or liquid tight flexible conduit in damp or wet locations. Only listed fittings shall be used. A separate grounding conductor shall be installed in all flexible raceways.

PART 3 EXECUTION OF WORK

3.01 All work shall be performed in a neat workmanlike manner. All efforts shall be made to coordinate the work with their trades.

3.01 Examination

- A. Verify field measurements and circuiting arrangements are as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition Drawings are based on casual field observation and available existing record documents. Report discrepancies to Architect/Engineer before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

- A. Disconnect electrical systems in walls, floors, and ceilings scheduled for removal.
- B. Coordinate utility service outages with Utility Company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from Owner at least 24 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Demolish and extend existing electrical work under provisions of General Conditions, and this Section.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring to source of supply.

- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.
- F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- G. Disconnect and remove abandoned luminaries. Remove brackets, stem, hangers, and other accessories.
- H. Repair adjacent construction and finishes damaged during demolition and extension work.
- I. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.
- J. Extend existing installations using materials and methods as specified.

3.04.1 TEMPORARY SERVICE

Existing power maybe used as a source of temporary service. Wiring for use of all trades throughout the building as follows: a 20 amp 120 volt source shall be available to all areas of construction with 50 ft. extension cord.

3.05 GENERAL:

- 3.05.1 All materials entering into the installation must be new and of the quality specified, otherwise to be the best commercial quality obtainable for the purpose. All parts of the work and the erections thereof must be performed in the best and most substantial manner in accordance with the standards of the trade and all applicable codes.
- 3.05.2 All trenching and backfill for underground conduit shall be in accordance with all pertinent provision of Section 02200 Earthwork of these specifications.
- 3.05.3 Any item inadvertently omitted from the plans and specifications, but which is necessary for the proper completion and operation of the work, in accordance with the intent of the plans and specifications, shall be supplied by the contractor at no additional charge.
- 3.05.4 All questions as to the interpretation or extent of the drawings, and specifications shall be referred to the Engineer.
- 3.05.5 Throughout the progress of the work, the electrical subcontractor shall examine at the site, architectural drawings, together with drawings of equipment companies and other trades, and shall take note carefully all architectural changes and corresponding changes in other lines so that no work will be installed which would have to be removed or altered.
- 3.05.6 This subcontractor shall be responsible that advance information be given to the General Contractor of location and size of all frames, boxes and openings needed.

- 3.05.7 The General Contractor will provide all boxed openings, recesses, lintels and bucks required for the admission of the work. Furnish him with all necessary information in ample time.
- 3.05.8 In no case may any structural member be pierced or violated in any way without written permission from the Engineer.
- 3.05.09 The electrical contractor shall take effective measures to protect all materials and fittings from loss or damage; and all pipe and duct openings from obstruction throughout the construction.
- 3.05.10 All dirt and debris resulting from the work shall be thoroughly taken up and removed from the premises. All equipment shall be cleaned for inspection and use.
- 3.05.11 All electrical conduit shall be concealed in ceiling space or partitions except EMT conduit located in Mechanical Room. Provide means of venting conduit, enclosures, etc. of condensation where moisture may occur.
- 3.06 COMPLETION:
- A. Provide properly executed certificate of inspection from authorities having jurisdiction.
 - B. Instruct such persons as the Owner designates in the proper operation and maintenance of the systems and their parts. Submit to the Engineer a letter naming the person or persons so instructed and the dates of such instruction.
 - C. Prepare and deliver four sets of complete literature showing operating, service and replacement data for all equipment which will require periodic maintenance or replacement.
 - D. Documentation : Proper and adequate documentation must be provided, this will include:
 - a. Accurate as-built drawings and sequences submitted in hardcopy and CD disk form updated via a standard 2006 Computer Aided Drafting (CAD) program)
 - b. Owner's manuals including technical spec sheets
 - c. Operator manuals

END OF SECTION