

SECTION 28 30 00
FIRE DETECTION AND ALARM

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes.
1. The section includes requirements for fire alarm detection and alarm.

1.02 REFERENCES

- A. The following is a list of standards which may be referenced in this Section.
1. National Fire Protection Association (NFPA)
 - a. NFPA 13 – Sprinkler Systems.
 - b. NFPA 70 – National Electrical Code.
 - c. NFPA 72 – National Fire Alarm Signaling Code
 - d. NFPA 101 – Life Safety Code
 2. International Fire Code – 2009 Version:
 3. Underwriters Laboratories (UL):
 - a. UL 268 - Smoke Detectors for Fire Alarm Signaling Systems
 - b. UL 497 B – Protectors for Data Communications and Fire Alarm Circuits
 - c. UL 864 - Control Units and Accessories for Fire Alarm Systems
 - d. UL 1424 – Cables for Power-Limited Fire Alarm Circuit
 - e. UL 1971 - Signaling Devices for the Hearing Impaired

1.03 SUBMITTALS

- A. Contractor shall submit all the product data in Division 28 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
 2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 283000.G01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
 3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data
1. Pursuant to Section 01300 Submittal Procedures.
 2. Manufacturer's data including materials of construction, methods of installation and related information for each item specified in PART 2 PRODUCTS.

1.04 CONTRACTOR QUALIFICATIONS

- A. The CONTRACTOR'S on-site supervisors shall be NICET Level III certified. A copy of all on-site supervisor's certifications shall be included with the CONTRACTOR'S bid.
- B. The CONTRACTOR shall have at least five (5) years of verifiable work experience installing addressable fire alarm systems in correctional facilities. If requested, the CONTRACTOR'S

on-site supervisors shall submit resumes for verification prior to contract award. The references shall include the following:

1. Work experiences summary.
2. Name, title, and phone number of references

1.05 PERMITTING AND SUBMITTALS TO THE AUTHORITY HAVING JURISDICTION (AHJ)

- A. The CONTRACTOR is responsible to provide drawings to the local jurisdiction having authority for approval and permitting. The drawings shall include at a minimum the voltage drop calculations and battery calculations. The CONTRACTOR shall be responsible for all fees required for plan review and permitting. The ENGINEER will provide a copy of the Contract Drawings related to the Fire Alarm System for the CONTRACTOR'S use
- B. A copy of the Product Data and Quality Assurance/Control Submittals shall be provided to the AHJ. In addition, a copy of the Contract Documents shall be included. The Contractor shall make clarifications or revisions as directed by the AHJ. All comments received from the AHJ shall be submitted immediately to the Engineer for review.

1.06 DESIGN BUILD REQUIREMENTS

- A. The CONTRACTOR shall be responsible for providing final design of the fire alarm system. The design build documents show the general nature of the fire alarm system. The CONTRACTOR shall provide all fire alarm devices required for a complete system in accordance with NFPA 72 and to the satisfaction of the AHJ. Design shall include the following:
 1. Quantity and location of all initiation devices.
 2. Quantity and location of all notification devices.
 3. Signaling line circuit (SLC) and initiating device circuit (IDC) design, including voltage drop calculations.
 4. Battery sizing and selection.
- B. The CONTRACTOR shall provide a Listed, fully addressable fire alarm control panel and fire alarm system.
- C. The fire alarm system shall include a remote annunciator, located as shown on the Drawings.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. **Fire Alarm Control Panel (283000.F01)**
 1. Shall be fully addressable, microprocessor based, UL 864 Listed.
 2. Signaling line circuit loop(s) shall support up to 198 addressable points.
 3. Notification circuits shall be configurable as Class B (Style Y).
 4. Shall perform basic detection and alarm as well as send an alarm signal to the Fire Department with the CPU failed.
 5. Shall contain an LED/LCD display on the front of the panel. The display shall accommodate two lines, 40 characters each. The display panel shall be backlit. The panel shall support upper case and lower case characters.
 6. Shall contain LED status indicators on the front of the panel. The indicators shall include:
 - a. Alarm
 - b. Supervisory
 - c. Trouble

- d. Silenced
 - e. Power
 - 7. Shall contain two general purpose Form C programmable relays.
 - 8. Shall contain one Form C trouble relay.
 - 9. A relay output board with ten general purpose Form C relays shall be provided.
 - 10. Shall contain a dual phone line, digital alarm communicator/transmitter (DACT).
 - 11. Shall contain an RS-485 bus for communication to system accessories.
 - 12. Shall contain an RS-232 interface for programming via PC.
 - 13. Software shall provide the following features:
 - a. Smoke detector automatic drift compensation
 - b. Smoke detector maintenance alert
 - c. Smoke detector point status
 - d. Non-volatile event history for 1,000 events
 - 14. FACP shall be Silent Knight 5808, or approved equal.
- B. Dual Path Communicator (283000.C90)**
- 1. Shall be provided with VOIP dial-out and cellular back-up dual-path communicator.
 - 2. The communicator shall be compatible with 2G, 3G, and 4G cellular networks.
 - 3. The communicator shall connect to the FACP primary and secondary dial-out ports.
 - 4. The communicator shall be Honeywell IPGSM-4GC, or approved equal.
- C. Remote Annunciator (283000.F02)**
- 1. 80 character LED/LCD display, backlit.
 - 2. Shall be flush mounted.
 - 3. Shall contain system acknowledge, signal silence, and system reset control switches.
 - 4. Shall contain an integral sounder with subsequent alarm/trouble resound.
- D. NAC Power Supplies (283000.N50)**
- 1. Provide remote power supplies for NAC loops at the FACP and remotely on each floor.
 - 2. Size batteries per NFPA 72 and the current edition of the Oregon Fire Code. Battery and enclosure sizing shall be the responsibility of the CONTRACTOR.
 - 3. Shall be listed for use with the FACP.
 - 4. Firelite FCPS-24FS8.
- E. Horn Strobe (283000.H01)**
- 1. Visual notification appliances shall be UL 1971 Listed.
 - 2. Notification appliances shall be wall or ceiling mount style.
 - 3. Notification appliances shall produce a minimum flash rate of 60 flashes per minute over the UL regulated voltage range of 16 to 33 VDC and shall incorporate a Xenon flashtube. Notification appliances shall have four (4) field selectable candela settings of 15, 30, 75 and 110 candela.
 - 4. Notification appliances shall be rated for 24 VDC.
 - 5. Notification appliance color shall be red.
- F. Visual Strobe (283000.V01)**
- 1. Visual notification appliances shall be UL 1971 Listed.
 - 2. Notification appliances shall be wall or ceiling mount style.
 - 3. Notification appliances shall produce a minimum flash rate of 60 flashes per minute over the UL regulated voltage range of 16 to 33 VDC and shall incorporate a Xenon flashtube. Notification appliances shall have four (4) field selectable candela settings of 15, 30, 75 and 110 candela.
 - 4. Notification appliances shall be rated for 24 VDC.
 - 5. Notification appliance color shall be red.
- G. Smoke Detectors (283000.S01)**
- 1. Smoke detectors shall be photoelectric type.

2. Smoke detectors shall be addressable.
 3. Smoke detectors shall be two-wire style.
 4. Shall be constantly monitored for changes in sensitivity due to dirt, humidity, dirt, and temperature.
 5. Shall provide advance notice to the FACP when requiring maintenance.
 6. Color shall be white.
- H. **Duct Smoke Detectors (283000.S20)**
1. Shall be compatible with Smoke Detectors (283000.S01).
 2. Detectors shall be addressable.
 3. Detectors shall be provided with sampling tube. Tube shall be sized by the CONTRACTOR.
 4. Detectors shall be provided with remote alarm indicator.
- I. **Manual Pull Stations (283000.M01)**
1. Shall be addressable.
 2. Shall be single action.
 3. Shall be provided with key reset. Key shall match FACP.
 4. Color shall be red.
- J. **Relay Input Modules**
1. Shall be used to monitor dry contact alarms, such as tamper switches and flow switches.
 2. Shall monitor for open and short circuits.
 3. Shall be DIP switch programmable.
 4. Shall support #14AWG wiring up to 2500 feet away from the input module.
 5. Shall contain a status LED.
 6. Shall be provided with cover and mount in 4" square or double gang electrical box.
- K. **Relay Output Module (283000.R01)**
1. Shall be addressable.
 2. Shall have two programmable Form C relays. Contacts shall be rated for 30VDC and 120VAC power limited circuits only. Form C contacts are not supervised.
 3. Shall be DIP switch programmable.
 4. Shall contain a status LED.
 5. Shall be provided with cover and mount in 4" square or double gang electrical box
- L. **Notification Appliance Circuit Conductors (283000.N01):**
1. Notification Appliance Circuit (NAC) Conductors shall be copper, un-twisted, unshielded, size as indicated on the Drawings. Conductor color shall be red (+) and black (-).
 2. NAC Conductors shall be NEC Type FPL, UL listed for fire alarm applications. Conductors shall listed for Power-Limited applications, and comply with NEC Article 760.
 3. NAC Conductor material shall be stranded copper.
 4. NAC Conductors shall be plenum rated.
 5. NAC Conductor size shall be 14/2 AWG.
 6. NAC Conductor insulation shall be PVC.
 7. NAC Conductor jacket cover shall be PVC. Jacket color shall be red and black.
 8. NAC Conductors shall be Southwire FPLP and FPLR, or approved equal.
- M. **Signaling Line Circuit Conductors (283000.S01)**
1. Signaling Line Circuit (SLC) Conductors shall be copper, twisted shielded pair, size as indicated on the Drawings. Conductor color shall be red (+) and black (-).

2. SLC Conductors shall be type NEC type FPL, UL listed for fire alarm applications. Conductors shall be listed for Power-Limited applications, and comply with NEC Article 760.
3. SLC Conductor material shall be stranded copper.
4. SLC Conductors shall be plenum rated.
5. SLC Conductor size shall be 16/2 AWG.
6. SLC Conductor insulation shall be PVC.
7. SLC Conductor shield shall be 100% aluminum polyester foil.
8. SLC Conductor jacket cover shall be PVC. Jacket color shall be red and black.
9. NAC Conductors shall be Southwire FPLP and FPLR, or approved equal

2.02 ACCESSORIES

A. Velcro Cable Wrap (283000.T01)

1. Shall be plenum rated.
2. Shall be black in color.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General.

1. All identification labeling shall be in compliance with Section 260553 Electrical and Control Identification.
2. The CONTRACTOR shall coordinate the installation of the 120 VAC power with the Fire Alarm installer. Care shall be taken to ensure that the 120 VAC branch circuit conduit is installed according to the Manufacturer's requirements and the NEC. The 120 VAC branch circuit conductors shall be installed within the FACP such that Code required separation is maintained between Class 1 conductors and the power limited conductors. Installing Class 1 conductors across power limited conductors or over the batteries shall not be acceptable.
3. All devices which contain end of line resistors shall be marked with a label on the device cover. The label shall read: "EOLR".
4. Fire alarm circuit conductors shall not be twisted when spliced with a wire nut.
5. All Fire Alarm System junction boxes shall be red.
6. Fire Alarm System wire and cable shall be arranged in a neat manner and securely supported in cable groups.
7. Fire Alarm System Wiring shall be protected from sharp edges and corners.
8. Coordination is the responsibility of the CONTRACTOR. If a conflict exists for the mounting location of devices, the CONTRACTOR shall bring it to the ENGINEER's attention during the rough-in phase and the ENGINEER shall provide direction. Failure to coordinate conflicts during the rough-in phase will result in relocation of devices at the CONTRACTOR's expense.
9. Devices shall be installed level and plumb. Devices shall be brought out plumb with the wall surface via UL listed spacers approved for this purpose if necessary.
10. The position of devices, as shown on the Drawings, are general locations only unless dimensioned. The CONTRACTOR is responsible to coordinate with various trades to ensure no conflict exists.
11. All strobes shall be synchronized.
12. All testing and demonstration shall be performed to the satisfaction of the AHJ and the Fire Marshal.

B. Testing

1. All fire alarm circuits shall be tested for open circuits and ground faults.
2. All smoke detectors shall be tested using a listed smoke detector tester product.

3. Alarm conditions shall be simulated, and the operation of all notification devices shall be verified.
4. Alarm conditions which require interfacing with other systems within the building, such as the Building Automation System and Lighting Control System shall be simulated. The CONTRACTOR shall verify the correct operation of these systems after receiving an Alarm signal from the FACP.

END OF SECTION