

Section 28 00 00 – Electronic Safety & Security (Maintenance; Common Work Results; Schedules)

1. See also Section 08 30 00 – Specialty Doors & Frames.
2. See also Section 09 50 00 – Ceilings.
3. See also Division 14 for Elevator requirements.
4. See also Division 23 for Instrumentation & Control for HVAC (DDC) and VFD for HVAC Standards.
5. See also Division 26 for Electrical.
6. See also Division 27 for Communications.
7. See also Laboratory Appendix for environmental controls, alarming, notification, signage, etc.
8. See also appendices for various space type requirements.
9. NEC and IEEE working clearance required and to be maintained.
10. NEC and IEEE definitions will apply to all standards that follow.
11. UO goals of sustainability, life-cycle costs, maintainability, serviceability, high performance, quality equipment, and efficient campus inventory must be maintained. First costs may be impacted slightly as a result, but a better product will follow.
12. Access control, CCTV, and intrusion systems information shall be considered sensitive information. As such, the release of detailed information about the systems and how such systems are monitored shall be limited to those with a ‘need to know’.
13. Exterior placement of any and all equipment requires CPRE and FS approval to ensure compliance with the UO Campus Plan. If approved, all University policies shall be followed.
14. Building system zoning requires FS and Utilities & Energy Management PM review and approval.
15. NO demolition of one item shall occur in order to repair and/or replace another item.
16. ALL deleted items **must** be removed and not just abandoned. All abandoned or deleted conductors shall be physically removed. Conduits, pull boxes and outlet boxes shall remain.
17. Systems and system components in new construction, remodels, and retrofits are to be compatible with existing systems and system components to the extent possible.
18. System Installation Requirements:
 - a. Systems shall be fully commissioned prior to acceptance.
 - b. Installer shall have a minimum of 5 years of full time experience in the installation and maintenance of systems with factory training and certification; documentation required.
 - c. Boxes, panels, equipment gutters, etc. are to be cleaned inside and out upon completion and prior to acceptance of work
 - d. Warranty repair response time: 4 hours maximum
19. Training provided **MUST** be to a maintenance/technician level for ALL systems. Trainings shall be conducted only by factory certified, factory trained personnel who can demonstrate a minimum of 2 years of experience in the installation and operation of the access control system installed.
20. ALL/ANY item that requires special tools and/or test equipment must be brought to the attention of the pertinent FS personnel prior to specification and/or installation.
21. Accessibility of Equipment:
 - a. Refer to and abide by all OSHA requirements, as appropriate.

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- b. Per the ‘Design Review Requirements’ at the beginning of this document, a drawing layer of ‘Maintenance Access’ is to be incorporated into ALL drawings and system designs. This layer MUST be maintained through all phases of design and construction.
- c. Equipment above ceilings shall be located within corridors or above doorways.
- d. Design and installation of all equipment shall be accessible for operation, maintenance, repair, and replacement as required by NEC and OSHA General Requirements. - 1910.303.
- e. Thorough coordination of ceiling access(s) with electrical equipment above.
- f. In mechanical and electrical rooms any components requiring routine service/maintenance must be installed / mounted below 7ft in height. Prior to installation of any component above 7ft requires onsite review and explanation with FS Maintenance and/or FS Electrical Supervisor.
- g. Inaccessible Equipment:
 - If after meetings, reviews, comments, etc., there are documented and/or discussed changes not incorporated into the construction documents and installed equipment is not accessible for operation and maintenance, equipment shall be removed and reinstalled at no additional cost to the UO or the project. Discussions of payment will occur with the design team.
 - ‘Accessible’ is defined as being capable of being reached without climbing or crawling under or over obstacles such as motors, pumps, belt guards, transformers, piping and ductwork. Access must not exceed 14ft in height, a typical ladder working height.

22. Identification:

- a. See also Division 26 for electrical identification requirements.
- b. Fire alarm wiring / cabling must be marked as such every 50ft.
- c. During finish construction, labeling is to be reviewed and approved by the PM, EH&S (Fire Alarm systems), and FS Lock & Door Shop (ACS, Surveillance, and Intrusion systems).
- d. All conductors (copper and fiber) shall be individually labeled within cabinets and at both ends of conductor.
- e. Fire Alarm: All circuit breakers, junction boxes, covers, etc. are to be labeled ‘Fire Alarm’ and red in color from the manufacturer; not just painted red.

23. Raceway & Boxes Conduit:

- a. As-built one-line drawing(s) is required for all buried, encased, concealed wiring and conduit.
- b. PM, EH&S (Fire Alarm systems), and FS Lock & Door Shop (ACS, Surveillance, and Intrusion systems) are to walkthrough the project to view pathways prior to encasement or enclosure.
- c. Fire Alarm and monitoring, and data/telecom wiring can share the same cable trays or conduit with N&TS and EH&S approval, and with proper and complete coordination.

End of Section

Section 28 10 00 – Electronic Access Control & Intrusion Detection (Access Control; Intrusion Detection)

1. Access Control Systems (ACS):

- a. The ACS system installed under this scope of work shall provide controlled access to building interior and real-time monitoring of doors at multiple locations simultaneously.
- b. The ACS system shall be controlled by FS Lock & Door Shop existing computer system. ACS system hardware installed under this scope must be compatible with current version and allows future upgrades.
- c. The ACS building controllers shall be LAN addressable and shall be connected to FS Lock & Door Shop provided Ethernet receptacles.
- d. At reader doors where power assist devices are located, the ACS system shall shunt the exterior power assist operator button while door is locked so that it may only be used with valid card presentation to protect power assist drive assembly.

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- e. The ACS system shall control primary access points to be determined with each project and requires FS Lock & Door Shop review and approval.
- f. All doors controlled by ACS shall be equipped with request-to-exit (REX) devices and door contracts.
- g. Required Submittals:
 - Manufacturer’s specifications and technical data for all components.
 - List of programming decisions that need to be made by the FS Lock & Door Shop for proper operation of the system. Included in this list shall be all console/local passwords or access codes as well as any proposed field-assigned passwords or access codes.
 - Panel and power supply drawings layouts on backboard allocated for CCTV and ACS in telecommunications closet. Indicate desired location of 120 VAC power receptacles on this drawing for coordination.
 - One-line diagram showing all devices, controllers, and cable types between devices.
- h. Access Control Products: The appropriate product models are to be approved by designated FS Lock & Door Shop during project design and specification.

<u>Access Control Product:</u>	<u>Manufacturer:</u>	<u>Model:</u>	<u>Note(s):</u>
Building ACS Controllers	AMAG	Multi-Node 2100 series	Required to integrate into existing campus access control system.
Proximity Readers	Indala	FlexPass mid-range FP3213A+ / 10022	To be 26 Bit Wiegand compliant for card only entry. Or with optional keypad entry.
ACS Rex Device	Bosch	To be approved	
ACS Door Contact	Sentrol	To be approved	
ACS Door Prop Alarm	Design Security, Inc.	To be approved	With key switch.
Electrified Locking Device	VonDuprin	6000 series; 24VDC strike plates	-
	HES	9600 series; 24VDC surface mounted rim device	-
Magnetic Door Lock Device	-	-	Allowed ONLY with prior FS Lock & Door Shop review and approval.
Wire & Cable	-	CAT 5	UL listed for use in plenum spaces. Installed per manufacturer’s instructions.
Outdoor Wire & Cable	-	CAT 5	UL listed for outdoor use; wet environments; recommended for such use by manufacturer. Installed per manufacturer’s instructions.
Door Release Button	-	-	Momentary switch as approved by FS Lock & Door Shop. Located at DVR or monitor station.
Post Base for Card Reader	-	-	OFCI; Division 08

2. Access Control Systems (ACS) Installation:

- a. Quality Assurance: All workers involved with this installation must have completed manufacturer training and have a minimum of 2 years experience installing like equipment or have a minimum of 5 years of installation experience with specified equipment.
- b. Install all equipment and cabling in a manner consistent with manufacturer recommendations and instructions.

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- c. Install all devices and components shown on drawings required for proper operation of the system.
 - d. Mount devices level and in a uniform fashion.
 - e. Install FS Lock & Door Shop furnished post bases for card readers in coordination with concrete pours. Also coordinate installation and pours with required power.
 - f. Contractor shall furnish and install all cabling associated with the operation of both CCTV and ACS system.
 - g. Contractor shall **not** pull any ACS cables in conduits containing or intended to contain voice and data wiring.
3. Starting Access Control (ACS) Equipment & Systems:
- a. Coordinate with FS Lock & Door Shop setup of Ethernet network and IP address assignment; setup programming for ACS building controllers; reader definitions; door alarm points.
 - b. When the installation of all system components and cabling is complete, initial testing shall consist of local walk-through, and working demonstration of all features.
 - c. All passwords or access codes for the system shall remain at factory default unless the factory default poses a security risk, in which case all passwords shall be communicated in writing and give written FS Lock & Door Shop approval of such change. Any costs associated with password recovery shall be borne by the Contractor.
 - d. The Owner shall be provided with a minimum of 2hrs training of the installed system after all startup and testing procedures have been completed and as-built documentation delivered.
 - Minimum hours of required training may increase based upon the system size and complexity.
 - Training will include both an overview for building occupants and an in-depth session for FS maintenance to a service level.
 - e. Prior to FS Lock & Door Shop final acceptance of the system all zones must be tested in the presence of designated representative(s) from FS Lock & Door Shop.
4. Access Control Systems (ACS) Closeout, Warranty, and Support:
- a. With as-builts, record drawings, O&M manuals, etc. deliverables a complete list is required of all system devices, power packs, etc. noting their installed locations.
 - b. Guarantee all work against faulty and improper material and workmanship for a minimum of 1 year from the date of final written acceptance by FS Lock & Door Shop, except where guarantee or warranties for longer terms are clearly requested and specified.
 - c. During the entire warranty period the Contractor must provide all related software upgrades to the installed system(s).
 - d. Upon notification of a problem, the warranty provider shall furnish within 48 hours at no cost to the Owner such labor and materials as are needed to restore the system to proper operation.
 - e. During the entire warranty period the Contractor must guarantee a 4 hour response time for problem resolution.
 - f. Prior to the end of the warranty period, with FS Lock & Door Shop present, the Contractor is to conduct a 1 year inspection repairing any item(s) at Contractor's cost and provide a report of system equipment and system operational functions.

End of Section

Section 28 20 00 – Electronic Surveillance (Video Surveillance; Electronic Personal Protection)

Section 28 20 00 – Electronic Surveillance continued

1. Surveillance and Intrusion Systems:

- a. All labor, equipment, materials, documentation and services necessary for a complete and operational Closed Circuit TV (CCTV) monitoring system. Work will include the installation of wiring, cabling, cameras, power supplies, digital video controllers, flat panel displays, and other components necessary to provide a fully operational CCTV monitoring.
- b. Installed system shall be a turnkey package including design review, construction supervision, coordination, and commissioning services.
- c. OFOI and/or OFCI hardware will be determined by each project with the FS Lock & Door Shop.
- d. The system wiring, equipment, and installation shall comply with all listed requirements as well as any and all applicable national, state and local codes and standards.
- e. System Description:
 - The CCTV monitoring system installed shall provide for real-time monitoring of multiple cameras at multiple viewing locations simultaneously, as well as, recording for later review of video.
 - The CCTV system shall be equipped with a video recorder (DVR or NVR where applicable NVR equipment is specified) that shall have the following characteristics:
 - i. Equipped with a 16 port PoE (Power over Ethernet) switch or 16 camera ports.
 - ii. Equipped to serve remote display of live and recorded video over client LAN. Client software shall be provided with DVR / NVR.
 - iii. Record at a minimum of 12 frames per second with DVR system and 5-7 frames per second with NVR system for each camera location simultaneously.
 - iv. Feature that it records only when motion is detected. Motion is defined to be changes in pixels on a camera allowing the user to specify the percent pixel change that defines motion.
 - v. DVR / NVR shall be a 16 camera unit with 500 GB storage capacity.
 - vi. Stored video shall be retrievable from the DVR / NVR indexed by time and have fast-forward and rewind functions.
 - vii. DVR shall be equipped with a keyboard, mouse, and 17” color LCD display.
 - viii. DVR / NVR shall allow live monitoring and continuous recording while viewing stored video.
 - Cameras shall:
 - i. Be 1/3 inch color cameras having minimum of 480 TV lines of resolution. IP cameras capable of low-light recording (IR if needed) and high resolution (720 lines of resolution or greater). All camera models must be approved by FS Lock & Door Shop.
 - ii. Have vari-focal lenses and auto-iris to allow for field-of-view optimization and ability to automatically adjust to changing lighting conditions. Lenses shall be those recommended by camera manufacturer.
 - iii. Be powered over limited energy conductors from a central power supply mounted in the communications closets of Point of Entry.
 - iv. Mini-dome cameras are to be used at elevator cab ceilings. Elevator Subcontractor will install coax cable in elevator traveling cable. CCTV Contractor shall run cable from elevator machine rooms to DVR / NVR and monitor. Coordinate camera installation in elevators with elevator installer.
 - v. Inventory of cameras may include: areas with cash handling equipment; bike storage; primary entries; stairwells; etc. Camera inventory and locations will be determined by each project and require FS Lock & Door Shop review and approval.

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- The CCTV system shall be equipped with FS Lock & Door Shop specified number of cameras.
- Surveillance Products: The appropriate product models are to be approved by designated FS Lock & Door Shop during project design and specification.

<u>Surveillance Product:</u>	<u>Manufacturer:</u>	<u>Model:</u>	<u>Note(s):</u>
Network Video Recorder	AMAG stand alone NVR or DELL server	To be approved	Where applicable NVR system and equipment are requested and specified.
Digital Video Recorder	Pelco	To be approved	Required to integrate into existing DPS remote view software. See also, previous system description within this section.
Standard Color Camera	Panasonic or Sony	To be approved	Or approved equal.
Minidome Color Camera	Bosch FlexiDome, Sony	To be approved	Vandal resistant 24 VAC, with variable focal lens and auto iris. Or approved equal.
Exterior Color Camera	Panasonic or Sony	To be approved	Weatherproof. Or approved equal.
Exterior Color Camera	Panasonic or Sony	To be approved	Weatherproof. Or approved equal.
IP Cameras	AXIS or approved	To be approved	IP cameras must be compatible with AMAG NVR Solutions system.
Cameras	ALL	ALL	At least 720 lines of TV resolution during normal lighting conditions. Low-light cameras may switch to black & white in low lux conditions. See also, previous system description within this section.
Camera Power Supply	Altronix	To be approved	16 fused output and 24 VAC. Or approved equal.
Camera Mounts & Adapters	-	To be approved	ALL cameras to include necessary mounts and adapters recommended by manufacturer for the application.
Camera Cable	-	To be approved	Cat5e or Siamese type depending on installation.
Security/Burglar Alarm	Radionics, Bosch, or Detection System Control Units	-	Programmable by Bosch RPS software, version 3.7 or later.

2. Surveillance and Intrusion Systems Installation:

- Quality Assurance: All workers involved with this installation must have completed manufacturer training and have a minimum of 2 years experience installing like equipment or have a minimum of 5 years of installation experience with specified equipment.
- Install all equipment and cabling in a manner consistent with manufacturer recommendations and instructions.
- Install all devices and components shown on drawings required for proper operation of the system.
- Mount devices level and in a uniform fashion.
- Camera power supplies are to mount in the Point of Entry rooms.
- Wiring to cameras shall be CAT 5e twisted pair and shall include any necessary components to transmit video and power across CAT 5e cabling.

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- g. Contractor shall furnish and install all cabling associated with the operation of CCTV system.
 - h. Contractor shall **not** pull any CCTV cables in conduits containing or intended to contain voice and data wiring.
3. **Surveillance and Intrusion Systems and Equipment:**
- a. Coordinate with FS Lock & Door Shop setup of Ethernet network and IP address assignment; camera setup to ensure proper focus and view to satisfaction.
 - b. When the installation of all system components and cabling is complete, initial testing shall consist of local walk-through, and working demonstration of all features.
 - c. All passwords or access codes for the system shall remain at factory default unless the factory default poses a security risk, in which case all passwords shall be communicated in writing and give written FS Lock & Door Shop approval of such change. Any costs associated with password recovery shall be borne by the Contractor.
 - d. The Owner shall be provided with a minimum of 2hrs training of the installed system after all startup and testing procedures have been completed and as-built documentation delivered.
 - Minimum hours of required training may increase based upon the system size and complexity.
 - Training will include both an overview for building occupants and an in-depth session for Facilities maintenance to a service level.
 - e. Prior to FS Lock & Door Shop final acceptance of the system all zones must be tested in the presence of designated representative(s) from the FS Lock & Door Shop.
4. **Surveillance and Intrusion Systems Closeout, Warranty, and Support:**
- a. With as-builts, record drawings, O&M manuals, etc. deliverables a complete list is required of all system devices, power packs, etc. noting their installed locations.
 - b. Guarantee all work against faulty and improper material and workmanship for a minimum of 1 year from the date of final written acceptance by FS Lock & Door Shop, except where guarantee or warranties for longer terms are clearly requested and specified.
 - c. During the entire warranty period the Contractor must provide all related software upgrades to the installed system(s).
 - d. Upon notification of a problem, the warranty provider shall furnish within 48 hours at no cost to the Owner such labor and materials as are needed to restore the system to proper operation.
 - e. During the entire warranty period the Contractor must guarantee a 4 hour response time for problem resolution.
 - f. Prior to the end of the warranty period, with FS Lock & Door Shop present, the Contractor is to conduct a 1 year inspection and provide a report of system equipment and system operational functions.

End of Section

Section 28 30 00 – Electronic Detection & Alarm (Fire Alarm)

- 1. References: City of Eugene; current IBC; current IFC per the authority having jurisdiction (AHJ).
- 2. Fire Alarm system design required review and approval by EH&S.
- 3. Magnetic door holders must be tied into the fire alarm system if the fire alarm system supports the function.
- 4. Access to detection devices must remain clear and accessible at all times.
- 5. Any device, component, etc. with locking characteristics shall be keyed to a cat 15 key.
- 6. Provide local/remote annunciation bypass.
- 7. Provide alarm verification function on smoke detector circuitry only.

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8. Minimum Documentation Requirements:

a. Catalog sheets:

- Showing configuration and dimensions of the equipment or device described.
- Providing technical specifications, such as operating voltage, operating temperature, and humidity limitations, mounting and wiring information, and a description of the function and operation of the devices.
- Showing choice of color; if color is an option.

b. Contractor AHJ approval drawings:

- Showing every device provided under this section at its relative spatial location.
- Sections and elevations utilized as necessary to accurately describe the installed location of devices.
- All devices, dampers, detectors, etc. shall be individually identified; at the device and on the AHJ approved drawings.
- Location of all devices, dampers, detectors, etc. shall include locating dimensions from fixed reference points.

c. Equipment mounting details:

- Showing mounting locations for floor and wall mounted equipment including distance from floor, column lines, and fabrication details for special mounting brackets.
- Details and special installation instructions; these details may be included on the plan drawings if the space allows.

9. System Operation:

- a. All fire alarm systems are to be tied into the central monitoring station per EH&S instruction.
- b. The system alarm operation subsequent to the alarm activation of smoke detector or other required initiating device, or any other approved normally open contact device shall cause the following operations:

- Identify the location of activation on the alarm panel LCD display and cause the alarm LED to flash and sound the tone-alert on the control panel and remote enunciator.
- Activate audible signals until silenced by authorized personnel.
- A supervised signal notifying Dispatch at DPS shall be activated.

c. Addressable system shall:

- Maintain smoke detector pre-selected sensitivity while compensating for temperature changes, component drift, and dust accumulation.
- Provide trouble signal at control panel prior to the point where the desired sensitivity can no longer be maintained and shall identify the specific detector.
- Provide a second trouble signal at the control panel when the desired sensitivity can no longer be maintained.
- Be capable of displaying the peak value registered by each smoke detector between service periods.
- On command provide a listing only of detectors which are about to reach the point where the trouble signal will result if those detectors are not cleaned.

10. Addressable Devices:

- a. Individual device annunciations shall be available at the control panel.
- b. Annunciation shall include the following conditions for each point: Alarm, Trouble, Open, Short, Device Missing / Failed ground fault.
- c. Shall have the capability of being disabled or enabled individually.

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- d. Up to a total of 250 addresses shall be available with a minimum of 100 address points. Field programming shall allow addresses to be added or dropped as required.
- e. Communication reliability is provided by parity data bit error checking and checksum routines.
- f. Device addresses must be set by rotary switch settings.
- g. Placement of the devices on the communications line in any random order of addresses shall be allowable.
- h. Device placement of certain order shall not be necessary for proper operation.
- i. Communications line distance up to 2500 feet to the furthest device shall be allowable. Communications line distance up to 10,000 feet total, including t-taps, shall be allowable.
- j. Addressable interface module shall provide required operations for connection to up to 250 addressable devices.
- k. Ceiling mount detector bases on flush/surface mounted outlet boxes and after building interior finishes have been completed and cleaned.
- l. Addressable Smoke Detectors, Heat Detectors, and Duct Smoke Detectors: Addressable detectors are to be 3 type technology, multi-sensor detectors with the following characteristics:
 - Integrated 3 sensing technology of ion, photo, and heat detection: Processing and analyzing information from each sensor.
 - Automatic device mapping: Detector transmittal of its location.
 - Electronic addressing: Permanently stored programmable address.
 - Environmental compensation: Detector compensation for adjustments in its installed environment to prevent unwanted alarms within 30 minutes.
 - Wide sensitivity range window.
 - Pre-alarm: Detector alerts prior to the sensor reaching a full evacuation.
 - Identification and alert of dirty or defective detector.
 - Automatic day and night sensitivity adjustment.
 - Stand-alone operation: Detector decisions and input of alarm even if the controller fails.
 - Twin status LEDs: Normal and alarm states.
 - Multiple mounting base potential.
- m. Addressable Smoke Detectors:
 - Units shall twist lock onto addressable base with alarm led.
 - Address shall be set by means of rotary switch in the base.
 - Unit shall connect to the addressable communications line and require no extra power connections.
- n. Addressable Heat Detectors:
 - Addressable thermal detectors, 155 degrees F rate of rise.
 - Units shall twist lock onto addressable base with alarm led.
 - Address shall be set by means of DIP switch in the base.
 - Address setting shall not require removal of the base.
 - Units shall connect to the addressable communications line and require no extra power connections.
- o. Addressable Duct Smoke Detectors:
 - Mount detectors on bases after dust and debris has been removed from ductwork.
 - Locate housing downstream of the supply fan and before the first ductwork elbow at a location recommended by the manufacturer.
 - Duct smoke detectors are to be mounted to the exterior housing of the duct and equipped with air sampling tubes. No in duct type detectors will be accepted.
 - Housing with photoelectric detector.
 - Units shall twist lock onto addressable base with alarm LED.
 - Units shall have remote test.

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- Address shall be set by means of DIP switch in the base.
 - Address setting shall not require removal of the base.
 - Units shall connect to the addressable communications line and require no extra power connections.
 - Duct smoke detectors must conform to NFPA 90A, UL 268A, and be UL listed for use in air-handling systems.
 - Provide sampling tubes running the full width of the duct in the center of the air stream.
 - Provide detectors that conform with the mechanical codes and to the specified air flows.
 - Provide detectors listed with and powered by the fire alarm control panel.
 - Provide detectors with a visible indicator that shows when the unit is in an alarm condition.
 - Provide a remote visible indicator for detectors located in concealed locations such as above a ceiling, over six feet from the finished floor, etc.
 - Identify remote lamps and switches as well as the affected fan units with etched plastic placards.
 - Provide detectors with auxiliary contacts to provide control, interlock, and shutdown functions for HVAC equipment.
- p. Addressable Manual Pull Station:
- Single action, locked, with Cat-15 keyed access only. NO glass or ceramic retainer bars.
 - Stations shall have their address set by means of a DIP switch on the back.
 - Station shall connect to the addressable communications line and require no extra power connections.
 - Stations shall be flush mount in remodel areas where construction allows.
 - If surface mounted devices are needed due to construction type, furnish with matching red boxes
- q. Addressable Zone Adapter Module:
- Units shall mount on standard 4” square box.
 - Address shall be set by means of rotary switch in the base.
 - Units shall connect to the addressable communications line and requires 24 VDC power.
- r. Addressable 4 Wire Module:
- Units shall mount on standard 4” square box.
 - Address shall be set by means of rotary switch in the base.
 - Units shall connect to the addressable communications line and requires 24 VDC power.
- s. Addressable Signal Module:
- Units shall mount on standard 4” square box.
 - Addresses shall be set by means of rotary switch in the base.
 - Units shall connect to the addressable communications line and requires 24VDC power.
- t. Addressable Control Module:
- Units shall mount on standard 4” square box.
 - Address shall be set by unsupervised operation.
 - Address shall be set by means of rotary switch in the base.
 - Units shall connect to the addressable communications line and requires 24 VDC power.
11. Alarm Signals:
- a. Install housing on recessed wall mounted back box (surface box on cement/cmu walls) within 6" below ceiling. Existing notification devices being replaced shall be replaced in their existing location. Identify wires with numbered labels in junction boxes, device boxes, or main panels.
 - b. Labeled numbers shall be consistent with as-built drawings.

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- c. Bells are to be mounted on a single recessed gang plate with a red exterior finish and interior finishes matching existing surfaces. Exterior and interior bells are to be 8".
- d. Horn and strobes devices:
 - Devices shall not be mounted in any location that has a likely potential to be covered / concealed in the future by other designed / installed features.
 - Horn in combination with strobe visual signals mounted on a double gang plate.
 - Strobe only devices mounted on a single gang plate.
 - Devices shall be acceptable for use under ADA standards.

12. Sprinkler Flow and Tamper Switches:

- a. Each device will require supervisory with interface module.
- b. Sprinkler valve positions to be supervised normally open unless special circumstances apply.

13. Fire Alarm Panel:

- a. Access to panel must be accessible via a corridor or mechanical room only.
- b. New panel shall replace existing panel in existing location.
- c. Cabinet to be surface mount with hinged door.
- d. Horizontal width limited to a maximum of 2'-0" and vertical height allowable from floor to ceiling.
- e. Panel accessories (notification appliance batteries, etc) are to be in line vertically with control panel within control cabinet.
- f. New panel shall be provided with 75% spare capacity for future system devices.
- g. New panel shall be keyed to a University cat-15 key.
- h. Fire alarm panels and system devices must be reconcilable within 30 minutes of installation or re-installation with out requiring program changes.
- i. Manufacturers known to be acceptable: Notifier; Edwards Systems Technology (EST) if 30min reconciliation requirements are met.

14. Installation and Wiring:

- a. Furnish and install Isolated Loop Circuit Protectors (ICLP) on communication, and signaling lines, including shields on all circuits that extend beyond the building by any means.
- b. The ICLP shall be located as close as practicable to the point at which the circuits enter or leave a building.
- c. The ICLP grounding conductor shall be No.12 AWG wire having a maximum length of 28 feet in as straight a line as practicable and connected to the building unified ground per NEC.
- d. The ICLP shall have a line response time and an earth response time of less than (1) nanosecond capable of accepting 2000 amps (8 x 20us pulse).
- e. Shield to earth current shall be 5000 amps maximum.
- f. The ICLP shall be protected by a high dielectric insulating material and be of physical size to allow mounting in a standard 4-11/16in square and 2-1/8in deep electrical box.
- g. Spark gap devices or devices incorporated in or installed within the Fire Alarm control panel in lieu of the specified ICLP are not acceptable.
- h. Wiring and conduit arrangement shall be supplied by vendor in shop drawings.
- i. Wire installed must be approved by the manufacturer for Power Limited fire alarm use per NEC.
- j. Final connections between the equipment and the wiring system shall be made under the supervision of a representative of the equipment manufacturer.

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15. Testing:

- a. A written Acceptance Test Procedure (ATP) shall be provided for demonstration/training on the system and certification of proper system operation. In coordination with the PM and EH&S, the ATP shall be prepared by the contractor and submitted to the EH&S office for approval four (4) weeks or more prior to the performance of the ATP that includes the following requirements.
- b. Prior to inspections / testing with the City of Eugene a 100% test of the entire system is required with the PM and EH&S. If this 100% test in an occupied building test must occur during off hours when the building is empty.
- c. Scheduling and performance of final inspection & testing with the Fire Marshall must be coordinated with the PM and EH&S, and building occupants.
- d. If the results are not satisfactory to EH&S, the corrections will be made and a retest will be required at the contractor's expense prior to City inspection.
- e. Contractor representative and fire alarm technician shall be present for all testing and the fire alarm technician shall conduct the testing.
- f. Testing will be performed in accordance with NFPA 72 and the City of Eugene's requirements.
- g. The following items and procedures will be required as a minimum for the testing of the system.
 - Bypass and control switches shall be operated to indicate proper supervision of the switch.
 - Valve and sprinkler flow supervision switches shall be operated to verify proper response.
 - Valve and sprinkler flow supervision switches shall have one wire removed to verify proper supervision.
 - Each alarm output, detection or supervision zone may be tested for proper response to ground conditions.
 - AC power shall be interrupted to see if the system will operate on batteries.
 - Critical fuses shall be removed to check for proper supervision.
 - Detectors shall be tested for alarm operation.
 - Alarm sounding devices will be tested for proper operation.
 - HVAC control functions and circuits shall be tested for proper supervision and operation.
 - Complete preliminary report form per Chapter 1 of NFPA 72.
- h. Additional requirements for testing may be as requested by local authority having jurisdiction and/or the EH&S representative.

16. Training:

- a. Vendor and installing Contractor shall conduct training session(s) during which maintenance and operational aspects of the system will be described and demonstrated to personnel selected by the PM and EH&S.
- b. The session(s) shall be conducted by a manufacturer's representative and installing Contractor thoroughly familiar with the characteristics of the installed system.
- c. Owner shall be provided with a minimum of 8 hours training of the installed system after all startup and testing procedures have been completed and as-built documentation delivered.
 - Minimum hours of required training may increase based upon the system size and complexity
 - Training will include both an overview for DPS staff and building occupants and an in-depth review/training session for EH&S Representative.

17. Closeout, Warranty, and Support:

- a. With as-builts, record drawings, O&M manuals, etc. deliverables a complete list is required of all system devices, power packs, etc. noting their installed locations.
- b. Reviewed and accepted record drawings will be available for verification purposes. Record drawings and performance testing are conditions for substantial completion.

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- c. Guarantee all work against faulty and improper material and workmanship for a minimum of 1 year from the date of final written acceptance by PM and EH&S, except where guarantee or warranties for longer terms are clearly requested and specified.
- d. Upon notification of a problem, the warranty provider shall furnish within 48 hours at no cost to the Owner such labor and materials as are needed to restore the system to proper operation.
- e. During the entire 1 year warranty period the Contractor must guarantee a 4 hour response time for problem resolution.
- f. During the entire 1 year warranty period the Contractor must provide all related software upgrades to the installed system(s).
- g. At end of the 1 year warranty period, with PM and EH&S present, the Contractor is to conduct a 1 year inspection and provide a report of system equipment and system operational functions.
- h. In addition to the 1 year system warranty, any software changes and/or updates that impact the life safety and/or panel function must be provided at no cost to the Owner for the additional period of 3 years.

End of Section

END OF DIVISION 28