

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

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28 00 00. ELECTRONIC SAFETY AND SECURITY

28 10 00. ELECTRONIC ACCESS CONTROL AND INTRUSION DETECTION

28 10 05. SECURITY SYSTEM: Commercial installations such as vending machine areas, food service facilities, and other areas in which money is handled, shall be provided with security systems connected to the campus central control system, which provides alarm signal and print out to the University Security Services. Requirements for area security systems must be discussed at the initial planning conference.

28 10 10. ACCESS CONTROL and ALARM MONITORING SYSTEM (ACAMS): The system shall be based upon, and connected to, the University's existing campus-wide Access Control and Alarm Monitoring System (ACAMS) The system is applicable to all buildings, all campuses, excluding the University Hospitals. All Columbus campus buildings shall require 24 hour remote monitoring and reporting, and shall use this ACAMS system, and shall report to University Security Services and the Physical Facilities Service Center. The regional campus buildings shall report to their respective security centers.

.1 MINIMUM REQUIRED INFRASTRUCTURE for LIFE SAFETY: Whether or not there is any access control specified or not, provide the initial basis of an Access Control and Alarm Monitoring Systems (ACAMS). Specify and provide as a minimum all of the following infrastructure for Life Safety, including:

.1.1 Minimum (1) Lenel Intelligent System Controller, including the following:

- .1.1.1 Host communications on path #1, TCP/IP.
- .1.1.2 Host communications on path #2, voice grade dial-up.
- .1.1.3 Communication jacks within the controller for path #1 and path #2.
- .1.1.4 Include eight mega-bytes (8Mb) of memory within the controller.
- .1.1.5 Micro serial device server.

.1.2 Quantity as required Lenel Input Control Module(s).

.1.3 Lenel manufacturer's battery backups for the above.

.1.4 NetShelter, to house the following:

- .1.4.1 OIT/UNITS primary fiber-to-wire media converter.
- .1.4.2 OIT/UNITS primary Ethernet switch.
- .1.4.3 Physical Facilities Ethernet switch.
- .1.4.4 UPS to power these items within the NetShelter.
- .1.4.5 UPS Network Management Card.
- .1.4.6 Door Tamper switches, front & rear, report to Lenel.
- .1.4.7 Dedicated 20A/120V power and duplex outlet to the UPS.
- .1.4.8 Door lock with Best 7-pin core.

.1.5 Fire Alarm System auxiliary points to be monitored shall include:

- .1.5.1 Fire Alarm (Detection) System Common Alarm
- .1.5.2 Fire Alarm (Detection) System Common Trouble Signal
- .1.5.3 Fire Alarm (Detection) System Common Supervisory Signal
- .1.5.4 Fire Suppression System Common Alarm
- .1.5.5 Fire Suppression System Common Trouble Signal

28 10 00. ELECTRONIC ACCESS CONTROL AND INTRUSION DETECTION (Cont'd)

28 10 10. ACCESS CONTROL and ALARM MONITORING SYSTEM (ACAMS): (Cont'd)

.1.6 HVAC system auxiliary points to be monitored shall include:

.1.6.1 HVAC System Common Loss of Heat Alarm.

.1.6.2 HVAC System Common Loss of Cooling Alarm.

.1.6.3 HVAC Loss of Critical Environments Alarm (if any critical environments apply).

1.7 Emergency Generator auxiliary points to be monitored shall include:

.1.7.1 Emergency Generator Is Running Alarm.

.1.8 This minimum infrastructure must be specified to be consistent with all of the requirements of the below Standards, paragraphs .2 through .11, inclusive.

.2 FIELD HARDWARE: The new field hardware shall be manufactured by Lenel Systems, International, Inc., Corporate Headquarters, 1212 Pittsford-Victor Rd., Pittsford, NY 14534-3820, and shall include:

.2.1 Quantity 1 or more, Intelligent System Controller(s) (ISC's), LNL-2000, minimum one per building, and/or additional one per individual business group if necessary to segregate different costs or different application requirements within any single building. Do not share ISC's between buildings. The primary Intelligent System Controller (ISC) must be mounted within the Main Distribution Frame (MDF) room.

.2.1.1 Host Dual Path communication shall be included and enabled:

A. Host Communication Path #1 shall be TCP/IP communications using Ethernet over the campus-wide OIT/UNITS/OSUNet (formerly SONNET) (fiber-based) data communications network, 10/100 BaseT.

B. Host Communication Path #2 shall be Dial-up communications over the campus-wide OIT/UNITS (copper wire based) voice communications network.

C. Within each Intelligent System Controller, provide data jacks for connection of the communications network wiring.

D. Whether or not there is any access control specified or not, each Intelligent System Controller shall include eight mega-bytes (8Mb) of memory within the controller, for storage of up to 350,000 cardholders and up to 1,000,000 events.

E. Lenel Micro Serial Device Server, LNL-ETHLAN-MICRO Cobox micro serial server, flash ROM, RJ-45 (10BaseT), diagnostic LED's.

.2.2 Quantity as required, Input Control Modules (ICM's), Output Control Modules (OCM's), Dual Reader Interface modules (DRI's), Magnetic-swipe Access Readers, Keypads, and/or Proximity Access Readers. Single Reader Interface modules (SRI's) are prohibited.

.2.3 Provide lithium battery for backup of local event memory and local databases.

28 10 00. ELECTRONIC ACCESS CONTROL AND INTRUSION DETECTION (Cont'd)

28 10 10. ACCESS CONTROL and ALARM MONITORING SYSTEM (ACAMS): (Cont'd)

- .2.4 Provide 12-VDC lead-acid battery for 4-hour backup for local controller and local module operation.
- .2.5 Door hardware operation shall remain exclusively on commercial power, and shall 'not' be battery backed-up. Door hardware shall be configured to close and lock upon loss of commercial power, unless rated as a fire door, which will then be required to latch but remain unlocked upon loss of commercial power. Refer to and coordinate with, Division 8, Doors and Windows, Section 08700, Hardware, of these Building Design Standards plus the Physical Facilities Lock Shop concerning door hardware and access control.
- .3 HOST-COMPUTER SOFTWARE and FIELD FIRMWARE AND FLASHWARE: The existing system host-computer software is Lenel OnGuard® Access™ manufactured by Lenel Systems, International, Inc., Corporate Headquarters, 1212 Pittsford-Victor Rd., Pittsford, NY 14534-3820. Furnish all firmware and flashware within new field hardware to be compatible with existing host computer software revisions as currently installed within the existing host-computer.
- .4 ADDITIONAL EQUIPMENT: Provide additional equipment within the communications Main Distribution Frame (MDF) room, as follows:
 - .4.1 NET-SHELTER ENCLOSURE: Provide a wall-mounted rack NetShelter enclosure, with adjustable front vertical mounting rail, adjustable mounting depth, glass front door, front and back doors open 180 degrees, double-hinged design on each door, integrated cable access holes, lockable doors, multi-purpose mounting rails, powder coat black paint finish, and ventilated. Enclosure shall be equivalent to American Power Conversion Corp. (APC) NetShelter WX Wall-Mount Enclosure 13U Glass Door, Black, APC part number AR100. Enclosure shall include and house the following hardware:
 - .4.1.1 OIT/UNITS FIBER-to-WIRE MEDIA CONVERTER: For connection to OIT/UNITS/OSUNet fiber data communications network, 10/100 BaseT (specific media converter to be provided by OIT/UNITS).
 - .4.1.2 OIT/UNITS PRIMARY ETHERNET SWITCH: For connection to OIT/UNITS/OSUNet data communications network, 10/100 BaseT, rack mount, (specific switch to be provided by OIT/UNITS).
 - .4.1.3 PHYSICAL FACILITIES ETHERNET SWITCH (PFnet Switch): Provide this switch, for connection to data communications network, 10/100 BaseT, rack mount, through the primary switch. PFnet switch shall be Cisco 2950 series 12-port, Cisco part number WS-C2950-12 (specific switch shall be subject to review/approval by OIT/UNITS and Physical Facilities).
 - .4.1.4 UNINTERRUPTIBLE POWER SUPPLY (UPS): Provide this Uninterruptible Power Supply (UPS), to power all of the above devices and exclusively power only these devices, include hot-swap battery feature, and shall be rack-mounted. The UPS shall be American Power Conversion Corp., APC Smart-UPS, 750VA, 120VAC, APC part number SU750RM2U (specific UPS subject to review/approval by OIT/UNITS and Physical Facilities).

28 10 00. ELECTRONIC ACCESS CONTROL AND INTRUSION DETECTION (Cont'd)

28 10 10. ACCESS CONTROL and ALARM MONITORING SYSTEM (ACAMS): (Cont'd)

- .4.1.5 UPS NETWORK MANAGEMENT CARD for the UPS: Provide this Network Management card. The Network Management card shall be American Power Conversion Corp., APC part number AP9617 (specific Network Card subject to review/approval by OIT/UNITS and Physical Facilities).
 - .4.1.6 Provide door tamper switches on front & rear doors, and report as an alarm to the Lenel system.
 - .4.1.7 Provide a dedicated, breakered, 20A-120vac circuit, in conduit, with duplex outlet within the NetShelter enclosure, dedicated to powering the UPS, and exclusively power only the UPS.
 - .4.1.8 The door locks for the NetShelter shall be purchased by the contractor through the Physical Facilities Lock Shop, and shall be field installed by the Physical Facilities Lock Shop. Lock cylinders shall be Best Lock Corp. with 7-pin cores, part number Best 5E7M1 series Cam Lock, and appurtenances.
- .5 LENEL AUTHORIZED VAR: The system shall be furnished and installed by a contractor that is certified by Lenel as an Authorized OnGuard[®] Value Added Reseller (VAR) of Lenel systems, for sales, installation, and service for the Columbus, Ohio area at the time of award of the subcontract for the system. All warranty service shall be by this same contractor.
- .6 CARD READERS and CARDS: University standard (lowest cost) card readers and cards are magnetic-swipe, using BUCK-ID card or University Hospital ID card, all using Wiegand communications protocol. Proximity readers, which are more expensive to purchase and maintain versus magnetic-swipe readers, shall be used only with the approval of Physical Facilities and for specific operational and/or safety requirements only. Cards for proximity readers, which are more expensive to purchase and maintain versus magnetic-swipe cards, are separately available for premium charge through University Security Services. Costs for proximity cards shall remain the responsibility of the Using group.
- .6.1 MAGNETIC-SWIPE CARD READERS: Lenel LNL2010W.
 - .6.2 MAG-SWIPE CARD READERS with KEYPAD: Lenel LNL2020W.
 - .6.3 KEYPAD, only: Lenel LNL834S121NN or LNL826S121NN.
 - .6.4 PROXIMITY READERS: Proximity readers, shall be used only with the approval of Physical Facilities and for specific operational and/or safety requirements only.
 - .6.4.1 PROXIMITY READER: HID Corporation, ProxPro II #5455B (N-00 04).
 - .6.4.2 PROX READER with KEYPAD: HID Corporation, ProxPro #5355A (K-00 09).
 - .6.4.3 HID Corporation (An ASSA ABLOY Group company).
9292 Jeronimo Road, Irvine, CA 92618-1905, USA,
Phone: 949 598 1600 or 800-237 PROX, Fax: 949 598 1690

28 10 00. ELECTRONIC ACCESS CONTROL AND INTRUSION DETECTION (Cont'd)

28 10 10. ACCESS CONTROL and ALARM MONITORING SYSTEM (ACAMS): (Cont'd)

.7 MONITORING CONTACTS: Door monitoring contacts, and wiring and conduits thereto, shall be concealed and invisible when the door is closed. Externally applied door monitoring contacts, externally applied conduit or wiremold, and wire without conduit are prohibited.

.8 AUXILIARY POINTS to be MONITORED/ALARMED: Provide monitoring and alarming of the following minimum auxiliary points, including:

.8.1 ACAMS system auxiliary points to be monitored:

.8.1.1 Door Tamper Switches from any-and-all enclosures for ACAMS controllers, ACAMS modules, and the NetShelter enclosure.

.8.1.2 Power Failure Status, for Commercial 120-VAC power, from any-and-all power supplies for ACAMS controllers, ACAMS modules, and the NetShelter enclosure.

.8.1.3 Power Failure Status or Low-Battery Status, for 12-VDC, Lead-acid Battery Backup, from any-and-all power supplies for ACAMS controllers, and ACAMS modules.

.8.2 Fire Alarm system auxiliary points to be monitored:

.8.2.1 Fire Alarm (Detection) System Common Alarm

.8.2.2 Fire Alarm (Detection) System Common Trouble Signal

.8.2.3 Fire Alarm (Detection) System Common Supervisory Signal

.8.2.4 Fire Suppression System Common Alarm

.8.2.5 Fire Suppression System Common Trouble Signal

.8.3 Building Automation System auxiliary points to be monitored:

.8.3.1 HVAC system Common Loss-of-Heat Alarm.

.8.3.2 HVAC system Common Loss-of-Cooling Alarm.

.8.3.3 HVAC system Common Loss-of-Critical-Environments Alarm (if any critical environments apply).

.8.4 Emergency Generator points to be monitored: It is important to never exceed 500-hours run time on any emergency generator within any 12-month period, to minimize operating hours, maximize generator life, and to avoid additional EPA permits for the generator.

.8.4.1 Emergency Generator Is Running Alarm.

.9 CABLE AND WIRE:

.9.1 All fiber optic cable shall be specified and provided consistent with all requirements of Appendix M, The Ohio State University Communications Wiring Standard.

.9.2 All TCP/IP communications wire and all Dial-up communications wire shall be specified and provided consistent with all requirements of Appendix M, The Ohio State University Communications Wiring Standard, 'and' consistent with all requirements of the manufacturers.

28 10 00. ELECTRONIC ACCESS CONTROL AND INTRUSION DETECTION (Cont'd)

28 10 10. ACCESS CONTROL and ALARM MONITORING SYSTEM (ACAMS): (Cont'd)

.9.3 All communications wiring between the Intelligent System Controller and all downstream modules, shall be specified and provided consistent with all requirements of all sections of Division 26 and 27 specifications, 'and' consistent with all requirements of the manufacturers. All communications on the ACAMS system using RS-485 communications protocol must use 2-pair twisted/shielded wiring, Belden #9842 or Belden equivalent.

.9.3.1 Belden #9842, or Belden equivalent

.9.3.2 Numbers of pairs - 2.

.9.3.3 Total numbers of conductors - 4.

.9.3.4 AWG - 24.

.9.3.5 Outer Jacket PVC - polyvinyl chloride.

.9.3.6 NEC/UL specification CM, NON-plenum.

.9.3.7 Outside diameter, .340 inches.

.9.3.8 (24 AWG stranded (7x32) tinned copper conductors, twisted pairs, polyethylene insulated, overall 100% Beldfoil® shield plus a 90% tinned copper braid shield, 24 AWG (7x32) tinned copper drain wire, PVC jacket.)

.9.4 All power wiring, and all control wiring to-and-from controllers, modules, readers, powered latches, etc., shall be specified and provided consistent with all requirements of all sections of Division 26 specifications, 'and' consistent with all requirements of the manufacturers.

.10 EXCLUSIONS: The University will 'not' monitor, and will 'not' respond to alarms for/from:

.10.1 Independent security systems.

.10.2 Call-in, phoned-in alarms from Remote Central Station providers.

.11 PROHIBITIONS:

.11.1 MDI ADDITIONS: It is expressly prohibited to make any additions to the Monitor Dynamics Incorporated (MDI) system.

.11.2 Single Reader Interface modules (SRI's) are prohibited.

.11.3 Externally applied door monitoring contacts, externally applied conduit or wiremold, and wire without conduit are prohibited

28 30 00. ELECTRONIC DETECTION AND ALARM

28 31 00. FIRE DETECTION AND ALARM

.1 GENERAL: Design the fire detection and alarm system to minimize risk to the University's Customers (students, patients, residents, researchers, staff, and visitors), minimize risk to the University's property, reduce the University's support costs, and allow for cost-effective future expansion by the University. Design a complete system including:

Control panels,
Annunciators,

Initiating devices:
Manual pull-stations,

28 30 00. ELECTRONIC DETECTION AND ALARM (Cont'd)

28 31 00. FIRE DETECTION AND ALARM: (Cont'd)

Automatic smoke detectors,
Automatic heat detectors,
Automatic rate-of-rise detectors,
Automatic flow switches, and
Other initiating devices (dry contacts, etc.) as required

Notification appliances:

Horns,
Strobes,
Other notification appliances (dry contacts, etc.) as required
Door releases,
Fan Shutdown Relays, and
Any other items as required for a complete system.

- .1.1 **SINGLE SYSTEM FUNCTIONS:** Within any single building, design a complete system that integrates the existing and new systems into a single system at one common location. For systems that are to be integrated with existing systems request the University Project Representative confirm that the existing system is operating normally, prior to and following construction. Integrate and update to current technology the following into one system:

Existing common alarms from existing systems,
New common alarms from new systems,
Existing common trouble signals from existing systems,
New common trouble signals from new systems (all trouble and alarm resets are to be located at one point),
Single-button building system, common alarm silence, silences existing and new systems in parallel, and
Single-button building system, common reset, resets existing, and new systems in parallel.
All panels shall be by the same manufacturer.

- .1.2 **COMPLIANCE:** All new systems shall be Underwriters' Laboratory (UL) listed as compliant with National Fire Protection Association (NFPA) Standards 72 A, B, C, D, and E, most current edition, and shall be installed in accordance with the Ohio **Basic** Building Code. Initiating devices for ventilation systems shall be installed in compliance with NFPA Standard 90A. Initiating devices for water flow shall comply with NFPA 13 (Sprinkler Systems) and NFPA 101 (Life Safety Code) and other appropriate or pertinent NFPA Standards regarding the installation, locations, and sensitivity of flow alarms and annunciation. Each piece of equipment shall be approved, listed, and labeled with the UL label.

- .1.3 **TECHNOLOGY:** Each system shall have indicator's showing zone location, zone alarm, zone trouble, and system trouble. The new systems shall be analog addressable with adjustable pre-alarm level, with analog addressable notification devices, and addressable appliances. Panels, devices, and appliances shall be based upon EEPROM memory (electrically erasable programmable read only memory) or "flash" memory, for address, sensitivity, and pre-alarm levels, and shall be programmable in the field by the University. (Panels, devices, and appliances limited to PROM memory, EPROM memory, or RAM memory are not acceptable).

ALTERNATIVE: Upon written exception from the University Engineer's Office, you may design an addition to, or expansion of, any existing system using technology matching the existing hardware. All other performance

28 30 00. ELECTRONIC DETECTION AND ALARM (Cont'd)

28 31 00. FIRE DETECTION AND ALARM: (Cont'd)

requirements, with the exception of analog addressable technology, shall be included.

- .1.4 ACCEPTANCE BY THE UNIVERSITY: The system must be demonstrated in the presence of the State of Ohio Fire Marshal (the authority having jurisdiction), the University's Director of Maintenance, and their designated representatives. During acceptance, the contractor shall demonstrate the following to the University's designees:
- A. Alarm Verification: - Report by device - Pinpoint location Device type identification and address
 - B. Alarm/Trouble per device and component
 - C. Full field programmability via desktop IBM compatible personal computer:
 - Address verify and change,
 - Sensitivity verify and change,
 - Pre-alarm level verify and change,
 - Field changes shall upload to central panels
 - Field changes shall download from central panels
 - D. Single-button building system, common alarm silence, silences existing and new systems in parallel, and
 - E. Single-button building system, common reset, resets existing and new systems in parallel.

System will not be accepted until all components and functions are demonstrated to be in full operation.

- .1.5 TRAINING FOR DAILY OPERATION: The following training for daily operations shall be specifically included: One full instructor-day, minimum 8-hours, of on-site instruction for the daily operation of the system, to be attended by the University's designed Operations personnel. All training shall be scheduled by the contractor in coordination with the University's Department of Physical Facilities, Training Officer, and his designated representatives.
- .1.6 ADDITIONAL SUPPORT DURING WARRANTY: In addition to the warranty for labor and materials as specified in General Terms and Conditions and Special Terms and Conditions, and Division 28 Specifications, the following shall be specifically, additionally included:
- .1.7 ADDITIONAL SUPPORT DURING WARRANTY:
Two full person-days, minimum 16-hours, of on-site support for the system during warranty. All support shall be at the request of the University's Director of Maintenance or designated representatives.
- .1.8 TRAINING FOR SYSTEM MAINTENANCE: The University desires to become self-sufficient and skilled to perform regular preventive maintenance, annual system inspections, remedial maintenance, and small renovations. In addition to the above training for operation, and additional support during warranty, the contractor shall include the following training for system maintenance, including the OEM manufacturer's standards for:
- A. OEM hardware tools and documentation,
 - B. OEM software tools and documentation,
 - C. OEM training, at the University's Physical Facilities Training Center, on the use of the above hardware and software tools, and

28 30 00. ELECTRONIC DETECTION AND ALARM (Cont'd)

28 31 00. FIRE DETECTION AND ALARM: (Cont'd)

D. OEM certificate of "Authorized Warranty Service Technician" or equivalent.

All training and diagnostics shall be identical to that as provided and available to the factory authorized service representatives. The training shall allow the University to perform all maintenance and inspection functions. The hardware tools shall include EEPROM programmers using industry standard IBM-compatible desktop PC's. The software tools shall perform on industry standard IBM-compatible desktop PC's, using industry standard MS-Windows operating systems. The training shall be conducted at the University's Physical Facilities Training Center, conducted by the manufacturer's trainers, and shall include classroom hands-on training with instructor, travel included, for minimum of five instructor-days, minimum 40 hours, of instructional time. All Training for System Maintenance shall be coordinated with the University's Department of Physical Facilities Training Officer.

.1.9 ANNUAL INSPECTIONS: The system, devices, and applications, along with OEM training of the University's Operations personnel, shall allow the University to perform the "One Person Walk Tests" by area, location, device, address, or system. The tests shall include:

- A. Full System
- B. Area
- C. Alarm/Trouble
- D. Silent/Audible Modes
- E. Printed Record of All Tests
- F. Audible Appliance Type & Identification
- G. Auto "Timed-Out" With Warning

.2 SYSTEM TYPE AND FUNCTIONS: System shall be analog, addressable, adjustable pre-alarm level, non-coded, continuous alarming type. An alarm shall continue to notify until the initiating device has been restored, and the single-button common building system reset switch has been operated.

.2.1 WIRING AND POWER: All wiring for Fire Alarm Systems shall be color coded. Each wire shall have numbered tag at both ends. This Standard requires that THW or XHHW shall be used for initiating and communicating devices as permitted by National Electric Code (NEC 2005-760). Multiconductor Non-Power-Limited Fire Alarm Cables are permitted to be installed as wiring within buildings for the following locations:

- A. Space used for Environmental air-handling purposes.
- B. In exposed or fished in concealed spaces.
- C. Where passing through a floor or wall in metal raceway.
- D. In rigid non-metallic conduit, such as over hung ceilings and for wiring in ducts and plenums. This does not include habitable rooms or areas of buildings, in which the main purpose is not air handling, or the joist and stud spaces of dwelling units. It shall be used or permitted on Fire Alarm circuits operating at 150 Volts or less. All initiating devices, all notification appliances, and all panels shall be under constant electrical supervision. An open or ground in any wire shall cause a trouble alarm to operate. The systems shall include battery standby power. Systems shall indicate a trouble alarm upon loss of battery standby power, and shall close a separate dry contact output. When commercial AC power is restored, the systems shall automatically revert to AC power, without operator

28 30 00. ELECTRONIC DETECTION AND ALARM (Cont'd)

28 31 00. FIRE DETECTION AND ALARM: (Cont'd)

intervention. Batteries shall be sized to provide a minimum of 24 hours of monitoring, plus 5 minutes of 100% full alarm output. Recharging systems shall be sized to recharge all batteries to 100% capacity within 12 hours. When the system is operating on battery for one minute, the fire door relays shall release to conserve battery power. Locate trouble alarms in a public area.

.2.1.1 All field wiring for Fire Alarm Panel and accessory control panel shall enter 4 x 4 duct (min.) above the panels. No connections other than through the top of cabinets and through the 4 x 4 duct shall be permitted.

.2.1.2 CLASS of CIRCUITS:

A. Initiating Device Circuits shall be Class A.

B. Signaling Line Circuits shall be Class A.

C. Notification Appliance Circuits shall be Class A.

.2.2 INDIVIDUAL INITIATION CIRCUITS: Design the initiation circuits to be zoned and separated as follows:

- A. Manual devices (all pull-stations) shall report independently from automatic devices (smoke detectors).
- B. Sprinkler flows shall report independently from other devices.
- C. All other devices shall be zoned as required per codes and application.
- D. Address assignments on any single circuit shall not exceed 75% of the address capacity of the circuit, to allow for future expansion.
- E. Power draw and/or voltage drop on any single circuit shall not exceed 75% of the power and/or voltage limitation of the circuit, to allow for future expansion.

.2.3 MANUAL DEVICES: Manual devices (all pull-stations) shall be addressable, surface mounted or semi-flush mounted as conditions dictate. New stations shall be double-action, with a key reset. Within any single building, new stations shall be keyed alike, such that a single key will function for both existing and new stations. The contractor shall include necessary labor and materials to unify key requirements within any single building. New stations shall be so arranged that they cannot be reset to normal without the use of a local key. The use of a local key shall not include code wheels, or code devices.

.2.4 AUDIBLE AND VISUAL ALARMS: Audible and visual notification appliances shall be addressable, continuous alarms, horns, and strobes located so that their operation will be heard and seen clearly in all areas regardless of the ambient level. It is also required that the strobe shall be equipped with synchronized light bursts. Alarm appliances shall be designed for parallel connection, Class A, style-D type circuit, DC operation.

- A. Address assignments on any single circuit shall not exceed 75% of the address capacity of the circuit, to allow for future expansion.
- B. Power draw and/or voltage drop on any single circuit shall not exceed 75% of the power and/or voltage limitation of the circuit, to allow for future expansion.

.2.4.1 STROBES: All audible alarms shall be equipped with a flashing strobe light.

28 30 00. ELECTRONIC DETECTION AND ALARM (Cont'd)

28 31 00. FIRE DETECTION AND ALARM: (Cont'd)

.2.5 ANALOG ADDRESSABLE DEVICES

.2.5.1 HEAT DETECTORS: Heat detectors shall be field-restorable, and may be either fixed temperature or rate-of-rise type, as the need requires. The selection and location of these detectors shall include consideration for ambient temperatures, and area to be covered. The devices shall be analog, addressable, and shall permit the University to adjust address, sensitivity, setpoint, and pre-alarm levels.

.2.5.2 SMOKE DETECTORS: Smoke detectors shall be photoelectric or dual-chamber ionization type, subject to the approval of the University. The devices shall be analog, addressable, and shall permit the University to adjust address, sensitivity, and pre-alarm levels. Examples of acceptable sensitivity test methods are as follows:

- A. Analog Addressable systems: Access the system's "Test" function at the main control panel and request a test report for detector address, sensitivity and pre-alarm setting.
- B. Non-Addressable systems: Place a test magnet on the detector, and the detector shall then respond with a series of coded beeps and/or flashes that indicate a certain sensitivity range.

.2.5.3 LED's FOR HIDDEN DETECTORS: When detectors and flow switches are installed hidden from plain view, remote LED notification lights must be installed at the ceiling line to show the location of the hidden detectors.

.2.6 REMOTE MONITORING: The University has centralized the monitoring of all security and other critical alarms, using a proprietary remote monitoring system based upon Lenel Intelligent System Controller equipment. The remote monitoring communication panels are located at the buildings. The System shall be installed and comply with Section 28 10 10. of this Standard. All Columbus campus buildings shall require 24-hour remote reporting and monitoring, and shall use this system, and shall report to the University Security Services and the University Service Center. The regional campus buildings shall report to their respective security centers. The fire alarm system shall report the following (via dry contact output) to the remote monitoring system:

- A. Common Building Fire Detection Alarm
- B. Common Building Fire Detection Trouble
- C. Common Building Fire Suppression Alarm
- D. Common Building Fire Suppression Trouble

For the existing Building, where MDI equipment is presently installed the Designer shall replace MDI with Lenel Intelligent System Controller (LISC). The Designer shall make certain that the existing and new Fire Alarm System are integrated into LISC as one common building Fire Alarm System. The Lenel Intelligent System, also reports Building Intrusion Detection Alarms and troubles. The Designer shall follow the guideline and direction of Section 28 10 10. of this Standard.

.3 ADDITIONAL COMPONENTS:

.3.1 CONTROL UNITS: Control unit shall be installed in a suitable steel cabinet with hinged cover, secured with lock and key. The control cabinet shall include:

28 30 00. ELECTRONIC DETECTION AND ALARM (Cont'd)

28 31 00. FIRE DETECTION AND ALARM: (Cont'd)

- .3.1.1 Line terminals for 120-volt single-phase power.
 - .3.1.2 Single-button building system, common alarm silence switch, silences existing, and new systems in parallel.
 - .3.1.3 Single-button building system, common reset switch, resets existing, and new systems in parallel.
 - .3.1.4 Remote signaling relays for:
 - Release of fire doors,
 - Shutdown of ventilation systems,
 - Remote annunciation
 - .3.1.5 Power to the control unit shall be limited to not more than 75 percent of the supply circuit capacity (power and/or voltage) rating.
- .3.2 ANNUNCIATORS: Annunciators and remote annunciators shall be equipped with identical displays. All annunciators and remote annunciators shall be fully supervised by the system, and the system shall audibly and visually indicate the fault of either component. Remote annunciators shall be a UL listed component as a UL listed control unit. Annunciator signals shall remain locked in until the annunciator is manually reset from the remote single-button building system common reset. Include annunciators to provide location/address identification where any of the following conditions exist:
- .3.2.1 Automatic devices are connected to the fire alarm system.
 - .3.2.2 A building has four or more fire zones. Each area on a floor separated by a firewall shall be considered a zone.
 - .3.2.3 Type: Lighted window type, operated from the zone controls of the fire alarm panel. Separately wired annunciator circuits are not approved. Signals on the annunciators shall remain locked in until manually reset.
 - .3.2.4 Location: Locate annunciator at the control panel and at other locations in the building that serve as the immediate access for the Fire Department to that building. The Associate shall consult with the Fire Department for the purpose of determining the building entrances that will customarily be used by the Fire Department. Consult University Architect for the name of the fire department that will serve the building.
 - .3.2.5 For additions to existing systems, the added annunciation shall be located at the same location as the existing annunciator panels.
- .3.3 SPARE MATERIALS, SERVICE STOCK: Spare initiating devices (smoke detectors, heat detectors, rate-of-rise detectors, manual pull stations, flow switches, valve tamper switches, contact monitoring units, bases, etc.) and notification appliances (horns, strobes, relays, bases, etc.) shall be furnished to the University by the contractor. Quantities shall be the larger of:
- .3.3.1 No less than 1 of each item, or
 - .3.3.2 Minimum 10 percent of each item, whichever is the greater quantity.
- .3.4 AS-BUILT DRAWINGS: Provide a set of as-built drawings of the fire alarm system indicating wiring layout, plastic covered, in or next to the fire alarm panel.

28 30 00. ELECTRONIC DETECTION AND ALARM (Cont'd)

28 31 00. FIRE DETECTION AND ALARM: (Cont'd)

.4 SPECIAL REQUIREMENTS FOR FIRE ALARM SYSTEMS INSTALLATION AND REVIEW.

.4.1 Associate Architect/Engineer shall make certain that device locations (Address or Location(s)/Life Safety) are shown and listed for review on the drawings. Associate shall coordinate room numbers with the University Project Representative and shall include the following statement in the specifications:

Prior to final programming of Fire Alarm System room numbers shall be verified for correctness.

.4.2 Program buttons on all main Fire Alarm panels shall be programmed as required.

.4.3 Specify that room(s)/area(s) with multiple devices have higher priority.

.4.4 Specify that the Contractor shall provide a copy of Fire Alarm program in every installation to the Associate Architect/Engineer as part of closeout documents.

.4.5 Record Documents including Controls, Fire Risers, etc. shall be on AutoCAD and shall be submitted to the University at substantial completion of the project and before the final payment shall be made by The University.

.4.6 Specify that Fire Alarm System shall be required to include a single BACnet communications output with IP Connection.

END OF DIVISION 28 – ELECTRONIC SAFETY AND SECURITY