

SECTION 12.0 E
CONSTRUCTION SYSTEMS AND ASSEMBLIES
STANDARDS AND GUIDELINES
ADDENDUM E:

Electronic Access Control Design Guide
Access Control System - Lenel

Basis of Design

The section applies to the design, rough-in, and installation of automated access control systems for University facilities. These systems control access at building entrances and at the doors that lead into specified controlled areas of the interior of buildings.

Physical Security: In addition to any provisions that may be required by law or code, design and construct both exterior and interior spaces to incorporate accepted principles of crime prevention through environmental design (CPTED), using natural (as opposed to technological) methods of providing surveillance, access control, and territorial reinforcement wherever possible.

Definition of Elements at Ground Level: For purposes of physical security, any element within 20 feet (6 m) of the ground, grade, or adjacent paving.

Security Zones:

- **Public Access Zone:** That area to which the public has free access, including public corridors, grounds, and parking lots.
- **Reception Zone:** The area to which the general public has access but beyond which access is restricted at all times.
- **Operations Zone:** The area to which only employees and visitors with a legitimate reason to be there have access.
- **Secure Zone:** The area to which access is always controlled and which is monitored continuously.

See other Guidelines Sections for additional requirements.

Background

The University of Houston has created an Electronic Access Control (EAC) Department that is the centralized management of the access control system for all buildings on campus. Lenel is the standardized system for gaining access to University facilities using an access card rather than a brass key.

The primary functions of EAC system are:

- To allow access privileges for each building user to be customized based on need.

- To allow access privileges to be quickly cancelled in case an access card is lost or stolen.
- To allow access to multiple buildings without the need of a brass key.
- To allow a monitoring and documented audit trail of activities at reader entrance doors.
- To allow doors to be automatically locked and unlocked according to a pre-established time schedule.
- To allow UHPD the ability to remotely lock a building or a group of buildings in the event of an emergency.

Scope

This section establishes guidelines for the design and installation of EAC in all new buildings and reconstruction projects.

Programming

EAC is used to control access at all exterior (zone) doors and at certain interior access control zones, such as computer labs, classrooms, office suites, audio/visual equipment rooms, and other zones with specific access concerns. To facilitate EAC, certain programming issues need consideration during design. These include:

- Physical separation between public/non-public areas.
- Physical separation between different departments/operating units in the same building.
- Access to the public after hours.
- Conflicts between access control and life safety, i.e., egress, latching of fire doors.
- Conflicts between access control and ADA accessibility.

At a minimum, all exterior doors of University buildings shall be controlled and/or monitored by EAC. Specific interior doors to be controlled shall be identified during conferencing with user representatives from the departments who will occupy the building.

Design Criteria

EAC equipment at each building consists of central control equipment within the building as well as specific devices at each door controlled by the system.

Central Control Equipment

The central control equipment is installed at an “EAC Backboard” which is located in a dedicated closet within the building. Each building controlled by EAC shall have at least one EAC backboard. Where EAC controlled doors are located on multiple floors of a building, a separate EAC backboard shall be provided on each floor. Each EAC backboard typically includes the following items:

- Intelligent Controller.
- Card Reader Interface Modules.
- Input Modules.
- Output Modules.
- Power Supplies and related accessories.

- Power Supply Network Interface
- Equipment Enclosures.

The specific quantity and types of equipment to be provided at each EAC Backboard shall be determined during the design phase based on the number and types of EAC doors to be controlled. Equipment shall be designed at 75% capacity to allow for future expansion.

(See drawing at end of section for typical arrangement of EAC Backboard.)

Door Devices

The types of devices provided at each door are determined by the access control function required. The four major access control functions and the devices required for each function are as follows:

- **CARD READER DOOR:** Allows entry using access card, scheduled locking and unlocking, and door status monitoring. Devices required include:
 - Multi-technology card reader.
 - Door contact switch. (Where applicable hinge installed)
 - REX (request to exit motion detector).
 - Sounder (if applicable)
 - Electric lock or electric exit device.
 - Power transfer hinge or Wired Loop
- **AUTO-LOCK DOOR:** Allows scheduled locking and unlocking and door status monitoring. Devices required include:
 - Door contact switch. (Where applicable hinge installed)
 - REX (request to exit motion detector).
 - Sounder.
 - Electric lock or electric exit device.
 - Power transfer hinge or Wired Loop
- **EXIT-ONLY DOOR:** Allows door status monitoring. Devices required include:
 - Door contact switch.
 - REX (request to exit motion detector).
 - Sounder.
- **EMERGENCY EXIT-ONLY DOOR:** Allows door status monitoring, provides audible alarm when door is used. Devices required include:
 - Door contact switch.
 - Sounder or horn.

These door functions may be applied to single doors and pairs of doors, with or without center dividing mullions.

Typical Card Reader Controlled Single Door

Handicap Exit Device Card Reader Controlled Double Door

Typical Exit Device Card Reader Controlled Double Door

Typical Equipment Arrangement

Elevator Control

Where required, EAC may be used to control elevators. This function requires the installation of card readers at elevator hall call stations and/or in the elevator car itself. The use of elevator control also requires that special provisions be made within the elevator equipment itself to accommodate the EAC installation.

Space Requirements

There shall be at least one dedicated closet in each building for the installation of EAC related equipment. In multi-story buildings where EAC equipment is located above grade, there shall be a closet on each floor where EAC controlled doors are located. Each closet shall have a minimum dimension from the panel board(s) of 3' 0" clear. Minimum usable wall space for equipment shall be 6'-0" wide by 8'-0" high.

Each closet shall contain the following provisions:

- One fire-retardant treated plywood "backboard" with minimum dimensions of 5' 6" wide x 7' 0" high.
- Minimum of one 120V, 20A 4-plex electrical outlet on dedicated circuit.
- Minimum of one Ethernet connection ports.

Design Assistance

The University EAC Manager will work with clients, project managers, and the University shops to incorporate the design of EAC into new construction and major renovation projects. The EAC Manager should be notified of new projects as early as possible in the design process.

Architects and Engineers (A/Es) are required to engage the services of a University-approved EAC Manager to design the building's EAC. For the current University of Houston EAC Manager, contact the Electronic Access Control Department.

Interdisciplinary Coordination

The work of this section shall be closely coordinated with other members of the design team. Specific areas requiring coordination include, but are not limited to the following:

- Electrical engineer: coordinate requirements for conduits, back boxes, cable trays, and electrical power.
- Hardware consultant: coordinate requirements for electric lock hardware.
- Architect: coordinate space requirements for EAC Backboards, preparation of doors and frames, and any special construction items needed (such as pedestals and closures for card readers).
- Elevator consultant: coordinate requirements for elevator travelling cable, card reader placement in elevator cars, and modification of elevator control equipment.
- Telecommunications consultant: coordinate requirements for network connections at EAC Backboards.

Departmental Responsibilities

University departments who will be using EAC shall appoint designated representatives who will be responsible for managing EAC and coordinating access needs with other members of their department. These representatives shall receive training on the Lenel Access Control System and act as department "user" and operator their department's access needs. At least two representatives shall be appointed; one that will serve as primary operator, and one that will serve as back-up operator.

Design Evaluation

The following information is required to evaluate the design:

- Programming Phase: Statement of intent to use EAC, or to rough-in only for control of access to facility and/or portions of the facility. Identify unique access zones under either scenario. Determine relationships with University EAC manager and vendor(s).
- Schematic Design Phase: Plan showing boundaries of access control zones. Outline specification identifying basic access control function for each zone. Locate and size of closets.
- Design Development Phase: Plan drawing showing access control zones, the location of controlled doors and other wall openings, an elevation view of doors showing locations of EAC equipment and other hardware. Show location of EAC closets and draw elevation of EAC equipment backboards. Draft specification listing specific functions for each controlled opening (see opening "functions" above). List proposed products. Coordination with the hardware schedule. Note "points-of-connection" for power and signal. Prepare "sequence of operations" diagrams for each EAC function. Status Matrix.
- Contract Document Phase: In addition to the DD requirements, prepare a schedule of doors and openings receiving EAC, listing all related equipment. Provide diagrams of conduit and raceway systems, power supply, data circuits, and show "points of connection" between work by University forces and work by Contractor. Final specification for the system.

Construction Submittals

The following minimum submittals are required from the Contractor:

- Refer to specification Section 28 10 00 -- Access Control System.

Related Sections

- UH Design Guidelines and Standards Section 12. 0, paragraphs as follow:
 - C1020 Interior Doors
 - B2031 Exterior Doors
 - C1025 Interior Door Hardware
- UH Design Guidelines and Standards Addendum D: Alarm and Special Hazard Protection Specifications
- Specifications Division 14 Conveying Equipment
- Specifications Section 28 31 00 Addressable Fire Alarm System
- University of Houston EAC Programming Standards (contact EAC Manager)
- <http://www.uh.edu/infotech/services/computing/networks/network-infra-standards/index.php> for UIT cabling standards
- Specification Section 26 05 19 Low Voltage Conductors and Cables

Products, Materials and Equipment

- The A/E shall work with University EAC Manager and the approved UH Lock shop, designing each individual building system to insure system compatibility with University EAC. The A/E shall be responsible for the design of the complete system.

- The A/E shall work closely with representatives from the individual University departments who will occupy the building to determine EAC requirements for interior doors.
- Equipment furnished under this section may be by any manufacturer who is approved by EAC Manager prior to completion of Contract Documents. The A/E shall submit a list of proposed equipment and vendors to the EAC Manager for approval.
- Refer to Section 28 10 00 Access Control System
- Specifications for EAC-related door hardware to be provided within Division 08 -- Openings.

Installation, Fabrication and Construction

- Some equipment will be installed by University EAC vendor.
- Design must clearly show “points of connection” between University and Contractor forces.
- Refer to Section 28 10 00 Access Control System.

END OF ADDENDUM