

SECTION 28 13 00 - ACCESS CONTROL

PART I - GENERAL

1.1 SUMMARY

- A. This specification section describes the furnishing, installation, commissioning, and programming of a complete, turnkey, hardwired Andover door access system. *[Note to AE: Contact Owner in regard to the Capital Project Brand Name Policy.]*
- B. Configuration of system shall be through Schneider Electric in Homewood, Illinois (Jerry Lanfear 708 271-4700).
- C. Provide a complete hard wired door access control system as specified herein and on the Drawings.
- D. *[Note to AE: Contact the U of I F&S Division Lock shop or access control electricians (Shop 55) for card access installation information once the floor plans with door locations have been identified for the Project. Typically, the access control system will be installed by the Contractor for new buildings, and by the F&S Shop 55 for remodel projects.]*

1.2 RELATED DRAWINGS

- A. *Drawing 28 13 00 – 1, Elevation View Single Door With Wall Mounted Card Reader Control Device Detail*
- B. *Drawing 28 13 00 – 2, Elevation View Double Door With Wall Mounted Card Reader Control Device Detail*
- C. *Drawing 28 13 00 – 3, Elevation View Single Door With IDH-MAX Card Reader Control Device Detail*
- D. *Drawing 28 13 00 – 4, Elevation View Single Door With Wall Mounted Card Reader Control Device Detail And ADA Door Operator*
- E. *Drawing 28 13 00 – 5, Panel Layout For Typical Mercury or Prox Installation (42x30)*
- F. *Drawing 28 13 00 – 6, Panel Layout For Typical IDH-MAX Installation (42x30)*
- G. *Drawing 28 13 00 – 7, Standard HID-PROX PRO Card Reader Wiring For Door Access System*
- H. *Drawing 28 13 00 – 8, Standard Mercury Security Reader MR-105 Card Reader Wiring For Door Access System*
- I. *Drawing 28 13 00 – 9, Standard Card Reader Wiring For IDH-MAX Door Access System*
- J. *Drawing 28 13 00 – 10, Standard Von Duprin EPT-10 Installation Detail 1*
- K. *Drawing 28 13 00 – 11, Standard Von Duprin EPT-10 Installation Detail 2*
- L. *Drawing 28 13 00 – 12, Standard Von Duprin EPT-10 Installation Detail 3*
- M. *Drawing 28 13 00 – 13, Standard Von Duprin EPT-10 Installation Detail 4*

1.3 QUALITY ASSURANCE

- A. Manufacturer: The access control system shall be a single-source manufacturer such that the single vendor distributes, supports, warranties and services all components.
- B. Installer: The installing dealer must be a factory-authorized service and support company specializing in the selected manufacturer's product, with demonstrated prior experience with the selected manufacturer's system installation and programming. The installer shall retain the services of a formally-trained Microsoft Windows 2000 technician.
- C. Registered Andover technician and Owner personnel shall certify all installations.
- D. All installations shall comply with the National Electric Code and U of I Facilities Standards.
- E. All components shall be UL listed.

1.4 AS-BUILT DRAWINGS

- A. In addition to the requirements for record documents as specified elsewhere in these Standards, as-built drawings shall document the entire installed wiring system. This documentation shall include a detailed wiring diagram (in AutoCAD.dwg format) and be submitted on both rewriteable CD and hard copy formats.

1.5 WARRANTY

- A. Provide one-year warranty on all parts and labor.
- B. Warranty requirements shall include furnishing and installing all software upgrades issued by the manufacturer during the one-year warranty period.

1.6 SUBMITTALS

- A. Shop Drawings for equipment provided under this Section. In addition to complying with requirements of shop drawings as stated elsewhere in these Standards, shop drawings shall include the following:
 1. AutoCAD drawings and load calculations for review and approval.
 2. Door contact shop drawings and installation details prior to installation for approval by Owner. Door contact details shall comply with *Drawings 28 13 00-1, 28 13 00-2, 28 13 00-3, and 28 13 00-4*.
 3. Mechanical and electrical notes and construction details for each device.
 4. Interconnection diagrams showing a detail of each device and interconnect wiring between devices. Block diagrams involving cross-referencing to catalog specification sheets will not be acceptable.
 5. Catalog literature with performance specifications, which indicate compliance to the specifications herein.
 6. Complete instruction manuals, service manuals, parts lists, and current list of local manufacturer approved service centers.
 7. System provider/installer shall provide all additional information or demonstrations required by the Owner and AE to demonstrate conformance with the specifications herein. Demonstrations shall be at a time and location and in a manner chosen by the Owner and AE.

PART 2 - PRODUCTS

2.1 EQUIPMENT

- A. All equipment shall be Andover.
- B. Andover Network Controllers accepted: **NetController II** with the following options:
 1. High Encryption
 2. Advanced Alarming (Includes SNMP & Redundant Alarming)

3. Critical Security

- C. Underwriters Laboratories (UL) shall list all components against fire, smoke control, and shock hazard.
- D. All Card Access Systems shall comply with *U of I Facilities Standards Section 23 09 23 – Building Automation (BAS) for HVAC*.
- E. Card access doors shall all fail secure, unless otherwise noted on the specification.
- F. Key bypass is required on all card access entrances. If a key is used, an alarm condition shall occur. (Note: Keys for these doors shall be used for emergency use only and not for distribution).
- G. Card reader on outside applications shall be weatherproof. If a swipe reader is used, an optional hood shall be used to protect from snow and ice.
- H. High temperature applications require cooling fans or proper ventilation.
- I. The card reader system shall contain self-diagnostics that continuously monitor the integrity of the system.
- J. All card readers shall be off set by a minimum of 12" if mounted on opposite sides of wall.

2.2 ELECTRONIC DOOR HARDWARE

- A. See *Section 08 71 00 – Door Hardware* for acceptable electronic locks, strikes, Panic Hardware, etc.

2.3 DOOR CONTACTS

- A. Door contacts shall be in the normally closed state when the door is closed.
- B. Recessed door contacts shall be provided, installed and connected by the selected Contractor on the access-controlled doorways. *[Note to AE: Only with prior approval by Owner, and when it is not possible to provide recessed door contacts, surface mount contacts may be permitted]*. These door contacts will allow the access control system to provide annunciation of forced entry or door propped conditions. In addition to the access-controlled doorways, there will be other doors requiring door contacts. (Note: To ensure detection of a forced entry, the addition of an electronic egress is necessary in addition to the door contacts)
- C. New wiring shall be provided for all locking hardware and any exposed wiring performed below 10 feet shall be protected using raceway stubs. These devices shall have end of line resistors (EOL's) wired to them in series. It is also the Contractor's responsibility to verify that the proper number of conductors for the wiring is pulled back to the security panels.

2.4 EQUIPMENT LOCATION

- A. All system components shall be accessible for service, adjustment, calibration, and repair. Do not install devices blocked by building structure, piping, or ductwork.
- B. New construction shall include a security closet adequate for all security equipment (no less than 3 feet by 6 feet). This space shall be air-conditioned and have an independent entry door.
- C. In existing buildings, all equipment shall be located away from sources of heat and humidity. Equipment shall be located away from primary room entry and exit paths. There shall be limited access to the controllers. This area for controllers shall also be free of extreme ambient temperatures.
- D. Equipment installed adjacent to or within the same space as electrical equipment (panels, switchgear, switchboards, transformers, etc.), shall be mounted no closer than 6 feet in any direction of this equipment.

2.5 EMERGENCY CIRCUITS

- A. All controllers shall have two (2) dedicated emergency circuits. One circuit shall be capable of running more than one controller through a 120v/120v isolation transformer. The second

dedicated emergency circuit shall be used for power supplies not related to the Andover Controllers (e.g. card reader, door hardware) and shall be protected by surge suppression.

- B. Emergency circuits may be utilized for door power in existing buildings, if existing loads permit.
- C. New installations shall have dedicated emergency circuits for door openers.

2.6 COMMUNICATION

- A. All systems shall be capable of communicating with the work stations.
- B. Campus Information Technologies and Educational Services (CITES) shall install and maintain the system required for communication between the Central Server and the building controllers.

PART 3 - EXECUTION

3.1 ANDOVER PANEL

- A. Electrical contractor shall: Provide a 6X6 trough above Andover System for all low voltage and data to travel through to get to one 3" nipple at the top right of each 30"X42" Andover Panel. (see *Drawings 28 13 00-5, 28 13 00-6, 28 13 00-7, 28 13 00-8, 28 13 00-9*)
- B. Provide two (2) 110 Vac Emergency Power circuits to lower left corner of Andover Panel with 15 ampere fused din-rail mounted disconnect.
 - 1. Provide 250 VA Sola CVS Power Conditioner 23-23-125-8 (minimum or equivalent).
Note: 110 Vac circuit from Sola shall be dedicated for Andover Controller power supply located in Andover cabinet.
 - 2. Provide a second 110 Vac circuit to be used for all other external electronic door hardware power supplies located within panel area.

3.2 WIRING

- A. Provide all wire as required to install the Door Access Control Alarm Monitoring System as specified herein.
- B. All wire and cable shall be Underwriter's Laboratories (UL) listed, and shall meet all national, state and local code requirements for its application.
- C. All wire and cable shall meet individual system or subsystem manufacturer specifications.
- D. All insulated wire and cable shall conform to the minimum requirements of Insulated Cable Engineers Association (ICEA) Standards.
- E. Wire and cable shall comply with the applicable requirements of the National Electrical Code (NEC), latest edition, in regards to cable construction and usage.
- F. All input cables and card reader cables shall be grounded at the NetController-II panel while taped and insulated at the device.
- G. Card reader, remote I/O or any other communication/data cable shall not be spliced between controller and device.
- H. Input cables from inside and outside push buttons for handicap door with electronic door access shall run directly to an Andover input and not to the door operator.
- I. The conductors of wires shall be copper, and have conductivity in accordance with the standardization rules of the Institute of Electrical and Electronics Engineers, Inc. (IEEE). The conductor and each strand shall be round and free of kinks and defects.
- J. Provide a 8"X10"X4" (minimum) J-box above drop ceiling on secured side of door for card reader, door position, electric power transfer, request to exit, ADA push buttons and other

low voltage wiring to door area. Provide a 1" conduit from this same J-box to nearest cable tray or Andover panel location (see *Drawings 28 13 00-1, 28 13 00-2, 28 13 00-3, 28 13 00-4*).

3.3 WIRE TYPES AND SIZES

- A. Low Voltage Power Cable: Wire size shall be a minimum of 18 AWG, twisted, stranded, insulated and jacketed.
- B. Control Point Cable (Low Voltage Power): Wire size shall be a minimum of 18 AWG, stranded, insulated, and jacketed.
- C. All wiring that is installed in cable trays shall be plenum rated.
- D. The following cable shall be used for door access control as a minimum:
 - 1. Card Reader (CR): 18/6 plenum shielded
 - 2. Door Position Switch (DPS): 18/2 Plenum shielded
 - 3. Request to Exit (RTE): 18/2 Plenum shielded
 - 4. Latch Position Switch (LPS): 18/2 Plenum shielded
 - 5. Any other inputs: 18/2 Plenum shielded
 - 6. Outputs: 18/2 minimum plenum (16/2, 14/2, or 12/2 as required due to voltage drop or other system requirements)
 - 7. DC Power wiring to doors: 18/2 minimum plenum (16/2, 14/2, or 12/2 as required due to voltage drop or other system requirements)
 - 8. Communication between I/O modules: 24/2, single-twisted-pair, tinned, shielded copper wire with an impedance of 100-120 Ohms and nominal velocity of propagation of 78%. Capacitance of the cable should be below 12.5 pF/ft between conductors and below 22pF/ft between conductor connected to ground and the next conductor.
 - 9. RS 485 communication cable between electronic door hardware and interface module at panel: 24 AWG min. shielded twisted pair, Category 5 cable.
 - 10. For other applications, follow manufacturer's requirements.
- E. Spare conductors shall be labeled and secured at each end.

3.4 ALL RACEWAYS AND WIRING SHALL BE INSTALLED IN ACCORDANCE TO THE FOLLOWING:

- A. National Electric Code.
- B. *U of I Facilities Standards*.
- C. A minimum of 3/4 inch conduit is required (Note exception to door frame EPT-10: door frame raceway can be 1/2").
- D. All raceway shall use approved connectors at each end and properly connected to an approved box or fitting (Note: can not leave raceway end inside wall or door frame).
- E. All electronic door access system wiring shall be installed in a minimum 3/4" EMT conduit except to an electric power transfer (EPT-10) at door frame (see *Drawings 28 13 00-1, 28 13 00-2, 28 13 00-3, 28 13 00-4, 28 13 00-10, 28 13 00-11, 28 13 00-12, 28 13 00-13*). All conduits shall be continuous and be connected to a box or fitting (not stopped inside a wall or door frame).
- F. All raceways shall be flushed in walls below drop ceiling to devices unless other wise noted on drawings.
- G. All wiring connections and terminations shall be accessible.

- H. All electronic door access system wiring shall be installed in conduit or cable tray with future available fill capacity.
- I. All electrical wiring shall be installed in metallic raceways or cable tray. Card access raceways shall be independent from all other building systems. Refer to *Section 26 05 34 – Low Voltage Raceways* for separation of system and power wiring requirements.
- J. All door hardware raceway and wiring shall be concealed and installed in a workman-like manner.
- K. A minimum distance of 24 inches shall be maintained between the card access system and any high voltage (50 volts line to ground or higher) wiring.
- L. Wire lengths shall not exceed 500 feet in length from the NetController II to the card reader.
- M. All line voltage (above 110 volts) shall be run in separate raceways from communication and other low voltage wiring.
- N. In new buildings (or new outside door frames) a new 1/2" raceway shall be installed from the door frame Mounted electric power transfer (Von Duprin EPT-10) and stubbed up above the drop ceiling for future use.

3.5 NETWORK CONNECTION

- A. The Electrical Contractor shall provide a 1-inch conduit from each NetController to the nearest CITES's network infrastructure (cable tray or U of I CITES Hub) with two (2) Ethernet cables.
- B. *[Note to AE: Contact the U of I F&S Department Card Access Systems support department for further information.]*

3.6 TESTING

- A. Contractor shall be responsible for supplying test equipment and qualified personnel to conduct acceptance tests.
- B. Contractor shall submit schedule for acceptance testing 21 days prior to beginning of testing and/or acceptance. Submittal shall include a sample of testing documentation. Representatives of Owner and/or AE may witness test procedures. Contractor shall notify Owner a minimum of 2 days in advance to allow for such participation.
- C. Contractor shall conduct tests during course of construction when identifiable portion of installation is complete. Alternatively, testing can be conducted after entire installation is complete if this does not delay the project schedule.
- D. Contractor shall describe test procedures prior to testing. Submit 3 record copies of results of tests to Owner and AE for approval. Final approved record copies shall be provided in hard copy format (3 copies) and (3 copies) of electronic format on CD format.
- E. If tests fail to meet stated specifications, make such adjustments, replacements and changes as are necessary and then repeat tests, which disclosed faulty or defective material, equipment or installation method. Provide labor and materials at no additional cost to Owner. Resubmit final approved record copies shall be provided in hard copy format (3 copies) and (3 copies) of electronic format on CD format.
- F. Testing shall be completed by a certified Andover representative and witnessed and accepted by the Owner and the AE.
- G. All systems shall be commissioned by the Owner upon completion of project. A minimum of 72 hours in advance notice is required.
- H. Contractor will be required to coordinate with and to permit Owner to test and verify all cables and wiring system hardware prior to final building inspections.

3.7 TRAINING

- A. System installer/provider manufacturer shall provide at least 8 hours of training for Owner's personnel to manage their own site at no cost to the Owner. This shall include but not be limited to adding and deleting users, setting schedules, and controlling permissive to doors in their areas or building.

END OF SECTION 28 13 00

This section of the *U of I Facilities Standards* establishes minimum requirements only.
It should not be used as a complete specification.