

SECTION 28 10 01
ACCESS CONTROL SYSTEMS

PART 1 – GENERAL

1.01 SECTION INCLUDES

This section covers Access Control System components to be installed between doors and BART intranet. It does not specify access cards/badges, security management system and electronic smart keys and locks.

1.02 RELATED SECTIONS

- A. 01 45 24, Testing Program Requirements
- B. 01 79 00, Demonstration and Training
- C. 08 71 00, Door Hardware
- D. 20 70 26, Common Materials and Methods for Electrical Systems
- E. 20 50 13, Raceways for Facility Services
- F. 01 33 00, Submittal Procedures
- G. 01 45 00, Quality Control
- H. 01 43 00, Quality Assurance
- I. 01 33 23, Shop Drawings, Product Data, and Samples
- J. 20 70 26, Common Materials and Methods for Electrical Systems
- K. 27 13 01, Communication Cables and Related Equipment
- L. Standard Drawing K001, Train Control and Communication Cabinets Power and Grounding Requirements

1.03 MEASUREMENT AND PAYMENT

- A. Separate measurement and payment will not be made for work required under this Section. All costs in connection with the work specified herein will be considered to be included with the related item of work in the Bid Schedule of the Bid Form, or incidental to the Work of this Contract.

1.04 REFERENCES

Electronics Industries Association TIA568-C Structured Cabling System

1.05 SUBMITTALS

- A. Drawings, product information, and samples shall be submitted in accordance with Section 01 33 00, Submittal Procedures, and Section 01 33 23, Shop Drawings, Product Data, and Samples.
- B. Where installation procedures, or any part thereof, are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be submitted and approved prior to installation.
- C. Installation shall be performed by persons certified by product manufacturer on the specific product.
- D. Operations and Maintenance manual shall be submitted for Contractor supplied access control system equipment in accordance with the requirements specified in Section 01 78 23, Operations and Maintenance Data.
- E. A list of Contractor recommended spare parts in accordance with Section 01 78 44, Spare Parts and Maintenance Materials shall be submitted.

1.06 QUALITY CONTROL

- A. Products shall be manufactured by firms regularly engaged in manufacturing products described in this section.
- B. Installation shall be performed by a qualified and experienced installer.
- C. Field testing shall be performed by persons certified by product manufacturer on the specific product.
- D. Also refer to Sections 01 45 00, Quality Control and Section 01 43 00, Quality Assurance.

1.07 SYSTEM DESCRIPTION

- A. Access control components are card reader, "request-to-exit" (REX) detector, electrified lockset, or electric strike, door contact to monitor intrusions, push bar in high-occupancy room for emergency exit, access control panels and power supplies installed within enclosures as indicated.
- B. Access control components shall be integrated into one system.
- C. Access controlled doors shall be hardwired to an access control panel located as indicated.
- D. Access control panels shall be connected to the network switch as indicated. Programming will be done by the District.

PART 2 – PRODUCTS

Access control system components between doors and communication network shall be as follows:

- A. Card Readers: To read smart card or ID badge presented for entry permission. They shall be Designated Matching Product (DMP) and:
 - 1. Designed or customized to read the BART Only Smart Card (BOSC) format;
 - 2. Tamper and water resistant;
 - 3. Either wall switch size type, with slotted mounting plate and a single gang switch box, or a mullion size type, suitable for mullion-mounted door installation on single-gang J-box with mud ring or on any flat surface;
 - 4. Flush mounted.
- B. Request-to-Exit (REX) Sensors: shall detect motion in the room exit coverage area and then signal the access control system. Request-to-Exit detectors shall be Designated Matching Product.
- C. Electrified locks or electric strikes as specified in Section 08 71 00, Door Hardware.
- D. Push (Panic) bars: refer to Section 08 71 00, Door Hardware.
- E. Energy Transfer Hinges: to pass low-voltage power from the hinge jamb to the electrified lock or electric strike (on a pair of doors) without having exposed wire. Each door with an electric lock or strike shall be equipped with one Designated Matching Product energy transfer hinge.
- F. Steel Door Contacts: shall contain a hermetically sealed magnetic reed switch. The contact and magnet housing shall snap-lock into a 1-inch diameter hole. Housings shall be molded from flame-retardant ABS plastic. Door contact shall be Designated Matching Product.
- G. Access Control Enclosures for controller and reader I/O boards shall be one or more Designated Matching Product wall-mount enclosures as required:
 - 1. Configure the enclosure with a tamper switch, and remove included battery, battery bracket, power supply board, and transformer if any. A twelve-volt DC power source shall be from one power supply for all access control panels (ACPs).
 - 2. Enclosure for a controller shall be of tile-mounting (low-density) type. An enclosure for reader I/O boards may be of rack-mounting (high density) type if more than two reader I/O boards are needed and if approved by the District.

3. Nameplates shall conform with Section 20 70 26, Common Materials and Methods for Electrical Systems. Name on plate shall be "ACP-Mx" for main panel(s), and "ACP-y" for reader I/O board panel(s) where "x" is a number between 1 and 9 if there are more than one main panel in the same site and "y" is a number between 1 and 9 if there are more than one I/O panel connected to the same main panel.
- H. Main Access Control Panel shall consist of a controller and an optional Multiplexer in a low-density enclosure. The tile mounting shall be used for ease of wiring and troubleshooting.
1. Controller: Designated Matching Product controller with two serial ports to connect to access I/O board buses:
 - a. One controller shall be in its own low-density enclosure so that the spare slot is reserved for a multiplexer.
 - b. If approved by the District, another controller shall be used instead of a multiplexer where an Ethernet connection from the protected section to the security management server is more appropriate than a serial connection to the first controller.
 - c. To retrofit ACP into a small space (e.g. at some traction power substations), a compact installation where a controller and two reader I/O boards are housed in a single high-density enclosure may be used if approved by the District.
 2. Multiplexer: A Designated Matching Product 8-port multiplexer shall be used (in the second slot of the main ACP) if there are (or will be) three or more RS485 buses from the controller to access I/O boards.
- I. Access I/O boards are reader I/O boards or alarm input boards. Relay output boards are not being used. They shall be in separate enclosure(s) from the main ACP.
1. Reader I/O Boards: one or more Designated Matching Product dual-reader I/O boards as required for the controller to monitor and control components on the doors. A maximum of two boards shall be installed in a low-density enclosure for tile mounting. Rack-mounting of up to nine (9) boards per enclosure may be used if approved by the District.
 2. Alarm Input Boards: one or more Designated Matching Product input boards as required. They are used to monitor alarms and input where there is no additional input port available on existing reader I/O boards or where there is no reader I/O board installed. For example, an input from Door Contact on a door not controlled by the system.
- J. Power Supplies: Overall solution shall comply with Standard Drawing K001 - Train Control and Communication Cabinets Power and Grounding Requirements. One Designated Matching Product power supply shall have:
1. Two voltages: 12VDC is for controller, access I/O boards and multiplexer; 24VDC is for door locks, REX, door contacts and card readers.

2. Designated Matching Product Power (Lock) Control Modules with fuse-protected, non-power limited outputs. Power control modules shall be able to configure for fire alarm interface (FAI) operation and fail-safe or fail-secure doors. The number of outputs needed to handle locks shall be sized to allow for expansion as warranted.
3. Designated Matching Product network communication module to enable remote monitoring of power supply status.
4. Input to the Power Supply shall be from an essential 120VAC source. If the essential power is not available, a Designated Matching Product line-interactive Uninterruptible Power Supply (UPS) with four-hour capacity is required.
5. A line conditioner is required if the power feed is from a non-communication (such as lighting or motor) electrical sub panel.
6. Nameplates shall conform with Section 20 70 26, Common Materials and Methods for Electrical Systems. Name on plate shall be "ACP-PSx" for power supply panel where "x" is a number between 1 and 9 matching that of the main panel.

PART 3 – EXECUTION

3.01 INSTALLATION

An installer not certified by product manufacturer may install locks, card readers, door contacts, REXs, cabling, power supply, and enclosures. The installer may also install controller and access I/O boards, but shall not power up without thorough inspection by a technician certified by product manufacturer for the specific product. The certified technician shall verify that wires are terminated correctly before turning on the power supply.

- A. Submit a spreadsheet listing the names and locations of all access-controlled doors and doors fitted with door contacts. The District will assign ID numbers for each device and return the completed spreadsheet to the Contractor. In addition, the District will provide IP addresses for the main ACP and Power Supply network communication module.
- B. Contractor shall identify and perform corrective measures to doors and frames that may require repair to ensure they will function properly. This shall include:
 1. Fixing excess gap between the door and the jamb, latch bolts that do not fully engage, insufficient clearance between the door and the jamb, the floor causing the door to stick, improper balance causing the door to move without assistance, and auto door closer that do not completely close the door.
 2. Providing for additional mounting reinforcement (i.e. metal mounting plate or metal brackets) to ensure structural integrity of the facility is not compromised.

3. Providing for any additional water-proofing measures to ensure the facility maintains its protection against external elements.
- C. A non-keyed non-functioning rotating door knob shall be installed on non-controlled doors so that they could be opened only from within the secured area.
- D. Card Readers shall be installed in a non-metallic, single gang surface mounted type box. All terminals for signal and LED lights in the card reader shall be wired and functionally tested.
- E. Energy transfer hinge wiring on the back needs to have proper deburring to prevent wires from being damaged.
- F. End-of-Line resistor packs shall be installed to applicable access control devices to provide supervision states (open, closed or faulted).
- G. Power and grounding shall follow Facility Standard Drawing K001, Train Control and Communication Cabinets Power and Grounding Requirements. In particular, enclosures shall be mounted on fiberglass boards or unistruts for complete isolation from the concrete or steel type wall. Raceways terminated to the enclosures and associated power supplies and isolation type transformers shall be provided with isolated coupler or isolation fittings.
- H. Cables between each controlled door and the associated ACP shall be routed as shown without any splices. All cables shall be installed complying with the requirements of Section 20 70 26, Common Materials and Methods for Electrical Systems, Section 20 50 13, Raceways for Facility Services, and Section 27 13 01, Communication Cables and Related Equipment. Network cable shall meet TIA568-C Structured Cabling System requirements and terminate to industrial jack and associated patch panel housing.
- I. Cable trays shall be secured by at least one tamper-proof screw.

3.02 TESTING

- A. Factory and field testing shall be performed in accordance with Section 01 45 24, Testing Program Requirements and as specified herein. Cables shall be tested for compliance with the requirements of Section 27 13 01, Communication Cables and Related Equipment.
- B. A factory test of one ACP connected to a full complement of access-controlled door devices shall be performed to demonstrate correct operation as defined in these specifications.
- C. Field functional testing shall be conducted by a technician certified by product manufacturer for the specific product in two phases following the installation of field devices, ACPs and interconnecting wires and cables.

1. Phase 1, Installation Verification: The correct termination of field wiring shall be verified using Contractor-prepared interconnection diagrams.
 2. Phase 2, Access controlled doors to ACP Testing: Access control functions shall be verified by entering and exiting each access-controlled door to confirm that the door status is correctly displayed on a laptop computer connected to controller(s) via the Ethernet port. The laptop computer shall be equipped with the necessary application software to perform the functional tests.
- D. Integration (End-to-End) Test: The Contractor shall provide support to the District in the testing from access-controlled doors to the security management server(s) and end-user interface (GUI).

3.03 TECHNICAL SUPPORT

Field technical support and assistance shall be provided to the District's integration testing and commissioning for the Access Control System. Recommendations shall be provided and troubleshooting shall be performed on issues and problems that may arise on Contractor provided and installed equipment, components and materials.

3.04 DEMONSTRATION AND TRAINING

Provide demonstration and training to the District's Operations and Maintenance personnel for Contractor-provided equipment in accordance with Section 01 79 00, Demonstration and Training.

END OF SECTION 28 10 01