

SECTION 281300 – ACCESS CONTROL SYSTEM (ACS)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Project provides Security Infrastructure for the Terminal A Baggage Handling System at George Bush Intercontinental Airport (IAH).
- B. This section includes Specifications for Access Control System (ACS) devices and controllers. The Access Control System will be utilized for access control to restricted areas and alarm monitoring of security conditions. Restricted access will be controlled with the use of HID iCLASS Elite ® card readers programmed specifically for HAS. Entry and Exits to the facility will be secured by iCLASS Elite and electronic door hardware. Hardware will include but not be limited to door position switches, delayed egress devices, electric panic exit devices, electric locksets, electric power transfer devices, and power supplies. Electric locking mechanisms will be selected consistent with the security level deemed necessary and the respective architectural design criteria for the specific areas.
- C. The Access Control System field panels and low voltage lock power supplies will be located in the IDF Room.

1.3 REFERENCES

- A. The publications listed below form a part of this specification. The publications are referred to in the text by basic designation only.
- B. Specific reference in specifications to codes, rules, regulations, standards, manufacturer's instructions, or requirements of regulatory agencies shall mean the latest printed edition of each in effect at the date of contract unless the document is shown dated.
- C. Conflicts.
 - 1. Between referenced requirements: Comply with the one establishing the more stringent requirements.
 - 2. Between referenced requirements and contract documents: Comply with the one establishing the more stringent requirements.
- D. References:

1. National Electrical Manufacturers Association (NEMA)
2. American Society for Testing Materials (ASTM)
3. National Electric Code (NEC)
4. Institute of Electrical and Electronic Engineers (IEEE)
5. UL Testing Bulletin

1.4 DEFINITIONS

- A. ANSI – American National Standards Institute
- B. EIA – Electronics Industries Alliance
- C. IEEE – Institute of Electrical and Electronic Engineers
- D. ISO – International Organization for Standardization
- E. Multi-path – The possible multiple routes of a single source of RF energy due to reflection, refraction, or diffraction.
- F. NEC – National Electrical Code
- G. NEMA – National Electrical Manufacturing Association
- H. UL – Underwriters Laboratories

1.5 SUBMITTALS

- A. Qualifications: Demonstrate compliance with requirements of Paragraph 1.7 below.
- B. Submit manufacturer’s technical data for each product provided.
- C. Submit HAS provided card reader software programming work sheet for each card reader a minimum of two weeks prior to cut-over of the respective card reader.
- D. Submit technical and operations manuals.
 1. Manuals shall describe function, operation, and programmable parameters for each device to be installed.
 2. Manuals shall include required maintenance to be performed.
 3. Manuals shall describe function, operation, and programmable parameters for each card and port for each device to be installed.
 4. Manuals shall include required maintenance to be performed.
 5. Manuals shall be suitable for the training of future personnel by the City, and for use as a reference by currently employed personnel in performing work assignments.
- E. As-built documentation. Notes shall be kept during initial installation and shall be made a permanent part of the installation manual pages as required.

- F. Provide as-built drawings.
- G. For each active device installed, provide a printed configuration including a printout of the device as displayed on the network management system. Printed configuration parameters for each port on the device shall accompany the written report.

1.6 CONTRACTOR'S DUTIES

- A. Perform all work, coordination, systems integration, engineering design, and testing, and shall provide all products required in order to ensure a fully operative system and proper installation of equipment. System operability and proper installation shall be verified via completion of the acceptance test plan.
- B. Provide all system documentation and submittals.
- C. Provide warranty and maintenance support as specified.
- D. Provide and pay for all labor, materials, and equipment.
- E. Secure and pay for plan check fees, permits, fees, and licenses necessary for execution of Work as applicable for the project.
- F. Give required notices.
- G. Comply with all codes, ordinances, regulations, and other legal requirements of public authorities that bear on performance of Work.

1.7 QUALITY ASSURANCE

- A. Contractor Qualifications:
 - 1. The contractor must be certified by the manufacturer of the products to be installed, adhere to the engineering, installation and testing procedures, and utilize the authorized manufacturer components and distribution channels in provisioning this Project.
 - 2. All members of the installation team must be factory certified by the manufacturer(s) as having completed the necessary training to complete their part of the installation. Written confirmation of such certification by manufacturer(s) shall be submitted to the Owner if requested.
 - 3. Contractor shall provide five references for projects completed within the last five years of approved equivalent scope, type and complexity.
- B. Equipment and materials supplied shall be a standard product of manufacturers regularly engaged in the manufacture and installation of access control systems and shall be the manufacturer's latest standard design. Items of the same classification shall be identical. This requirement includes equipment, modules, assemblies, parts, and components. Electrically powered equipment shall be UL approved. Electronic equipment shall meet the requirements of CFR 47 Part 15.

- C. All hardware, software, firmware, and/or operating system requirements given are the minimum requirements. The Contractor's product shall meet or exceed these requirements. The product selected shall meet the operational, functional, and performance requirements specified herein. Additionally, due to the rapid advancement and antiquation of technology related products, the supplied product shall be the "contemporary technical equivalent" of that specified. "Contemporary technical equivalent" shall be based on a comparison of technology at the time of publication of specification to the technology at the time of the first product submittal. Final product approval is at the sole discretion of the City.

1.8 WARRANTY

- A. Warrant all equipment and work for a period of not less than one year following formal notice of substantial completion or commencement of beneficial use. The warranty shall ensure that the installed equipment will conform to its description and any applicable specifications, and shall be of good quality for the known purpose for which it is intended. The warranty shall allow for replacement or repair at the discretion of the City Engineer and shall include all upgrades for firmware and/or operating systems.
- B. Software Licenses
 - 1. Required software licenses shall be identified and supplied by the Contractor.
 - 2. All software licenses and warranties shall be registered in the name of Houston Airport System.

1.9 PROCUREMENT

- A. Procure equipment specified in this document in order to ensure that the technology is acquired in a timely fashion, but not outdated by the installation date.
- B. The Contractor shall not purchase any materials requiring submittals until the City Engineer approves the submittal for that material and the Technology Implementation Schedule.
- C. All products shall be purchased not earlier than 6 months prior to installation.

1.10 DOOR PERMITTING

- A. Contractor is responsible for submitting permit drawings for approval by the City of Houston permitting office.
- B. Contractor is responsible for coordinating the final inspection with the City of Houston permitting office.
- C. Contractor is responsible for all fees and materials required for door permitting.
- D. Contractor shall notify Engineer if door configuration is not code compliant.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. All products shall be procured not earlier than 6 months prior to installation as required to ensure delivery of current technology. Contractor shall warrant that all products will be supported by the contractor and manufacturer for a minimum of two years following acceptance by the Owner.
- B. Unless otherwise noted, all materials and equipment shall be new, of the type, capacity, and quality specified and free from defects. Material shall bear the label of, or be listed by the Underwriters' Laboratories (UL.) unless of a type for which label or listing service is not provided.
- C. All equipment listed in this specification may not be required. It is the Contractors responsibility to determine exact equipment and quantities from the contract drawings.
- D. For compatibility and ease of installation, materials shall be of same brand or manufacturer throughout for each class of material or equipment, wherever possible.
- E. All enclosures for all equipment shall be of metal throughout the system unless noted otherwise.

2.2 INTELLIGENT FIELD PANELS (IFP'S)

- A. The intelligent field panel shall be connected to the security host, by means of a TCP/IP network. It shall respond to commands from the host. Each IFP shall connect into the TCP/IP network through an Ethernet hub. The IFP shall forward to the host information regarding access, status and alarms, which the IFP has gathered from the readers and sensor devices that the IFP controls. The IFP shall meet or exceed the following functional requirements: each IFP shall be identifiable from the central host by means of a unique IP address. IFPS and associated modules and components shall be manufactured by Honeywell, no substitution.
- B. The IFP shall operate normally as an online device.
- C. In its offline mode, the IFP shall be able to save (buffer) 35,000 badge transactions.
- D. When the IFP returns to online mode from its stand-alone (offline) mode of operation, the transactions it stored shall be transmitted to the host during the subsequent polling sequences. Such transmission shall not impede current transaction processing. Historical activity must be differentiated from current activity.
- E. Any portal controlled by the IFP shall be capable of being opened or closed by the issuance of a command from the host.

- F. Each IFP shall be capable of supporting up to 32 card readers for badge access.
- G. The IFP shall support readers, which utilize the magnetic stripe badge technology.
- H. Time shall be generated locally at each IFP, and the local time shall be capable of being updated for accuracy from a host master clock at anytime.
- I. The IFP shall be in current factory production.
- J. The IFP shall include power backup in the form of re-chargeable batteries. In the event of an AC power failure, the battery backup shall protect any data or software stored in the memory of the IFP for not less than 1 hour.
- K. The IFP shall be installed with capacity to connect one additional card reader for each 3 card readers installed.
- L. Operation from 2 to +43 degrees Celsius, at up to 85% non-condensing relative humidity.
- M. Provide each IFP with an enclosure. Enclosures shall be rack mounted if it is determined that this configuration would result in a more reliable, simple to service, and less costly system. Remote mounting of these devices is also approved. Provide each enclosure with an integral tamper alarm switch.
- N. The IFP shall be capable of maintaining a database of badge holders, badge holder PINs (user definable) and their privileges. During degrade mode, the IFP will continue to grant appropriate accesses for individuals based on this database and shall not degrade the access selection rules. IFPs are to be capable of maintaining at least 100,000 badge holders.
- O. The IFP shall communicate via an Ethernet TCP/IP or RS232 communication data interface.
- P. Provide the intelligent controller with an Ethernet daughter board, a 3MB memory expansion module and a daisy-chain harness.
- Q. Component models:
 - 1. Intelligent Field Panels PW6K1IC
 - 2. Enclosure PW5K2ENC1
 - 3. Enclosure power supply With Battery Backup PW5K2E2PS
 - 4. Dual Reader Module PW6K1R2
 - 5. Input Module PW6K1IN
 - 6. Output relay Module PW6K1OUT
 - 7. Ethernet Daughter Board PW5K1EN
 - 8. 3MB memory Expansion PW5K1M4
 - 9. Daisy-chain harness PW5K1DCC

2.3 CARD READERS

- A. Provide iCLASS Elite Contactless Smart Card readers, or equivalent, as shown on the drawings. Card readers shall be "single-package" type, combining controller, electronics and antenna in one package, in the following configurations:
- B. R40 - Contactless Smart Card Reader, Wall Mounting (Single-Gang Mounting Applications):
1. Provide "single-gang" mounting style contactless smart card readers for wall mounting, vehicle stanchions and pedestals, and where shown on plans.
 2. The reader shall be of potted, polycarbonate material, sealed to a NEMA rating of 4X (IP65).
 3. The reader shall contain an integral magnet for use with an external magnetic reed switch to provide tamper protection when connected to an external alarm system.
 4. The reader shall be UL/C 294 listed, and shall be FCC and CE certified, and shall conform to the following ISO Standards: 15693 (read-only), 14443A (CSN read-only), and 14443B2 (read-only).
 5. Transmit Frequency: 13.56 MHz
 6. The reader shall have an approximate read range of 1"- 4.5" when used with the compatible access card.
 7. The reader shall require that a card, once read, must be removed from the RF field for one second before it will be read again, to prevent multiple reads from a single card presentation and anti-passback errors.
 8. The reader shall be capable of reading access control data from any iCLASS contactless smart card or equivalent, and transmitting that data in SIA standard Wiegand format.
 9. The reader shall be capable of reading the CSN (card serial number – a permanent, unique identification number) from any MIFARE® card using the S50 chip or equivalent, and transmitting that data in SIA standard Wiegand format.
 10. The reader shall have a Wiegand output port and shall operate under internal control for read-only access control applications.
 11. The reader shall have separate terminal control points for the green and red LED's, and for the audible indicator.
 12. The reader shall have multiple LEDs for increased visibility.
 13. The reader shall have an audio transducer capable of providing unique tone sequences for various status conditions.
 14. The reader shall have a configurable hold input, which when asserted shall either buffer a single card read or disable the reader, until the line is released. This input may be used for special applications or with loop detectors.
 15. Access control data shall be protected using 64-bit diversified security keys, encrypted RF data transmission, and mutual authentication using a proprietary symmetrical key-based algorithm.
 16. Security keys in the cards and readers shall be required to match, and may be customized for individual sites by using the iCLASS CP400 Access Credential Encoder (or equivalent) or by special order from the factory.
 17. The reader shall have flash memory to allow future feature enhancements to be added in the field.
 18. The reader shall have a lifetime warranty against defects in materials and workmanship.
 19. Color shall be black.
 20. HID R40, no substitutions.

- C. R10 - Contactless Smart Card Reader, Special Mounting (applications with a minimum of mounting space) Provide “surface” mounting style contactless smart card readers for door mullions, special minimum-space mounting configurations, and where shown on plans.
1. The reader shall be of potted, polycarbonate material, sealed to a NEMA rating of 4X (IP65).
 2. The reader shall be UL/C 294 listed, and shall be FCC and CE certified, and shall conform to the following ISO Standards: 15693 (read-only), 14443A (CSN read-only), and 14443B2 (read-only).
 3. Transmit Frequency: 13.56 MHz
 4. The reader shall have an approximate read range of 1”- 3” when used with the compatible access card.
 5. The reader shall require that a card, once read, must be removed from the RF field for one second before it will be read again, to prevent multiple reads from a single card presentation and anti-passback errors.
 6. The reader shall be capable of reading access control data from any iCLASS contactless smart card or equivalent, and transmitting that data in SIA standard Wiegand format.
 7. The reader shall be capable of reading the CSN (card serial number – a permanent, unique identification number) from any MIFARE® card using the S50 chip or equivalent, and transmitting that data in SIA standard Wiegand format.
 8. The reader shall have a Wiegand output port and shall operate under internal control for read-only access control applications.
 9. The reader shall have separate terminal control points for the green and red LED’s, and for the audible indicator.
 10. The reader shall have multiple LEDs for increased visibility.
 11. The reader shall have an audio transducer capable of providing unique tone sequences for various status conditions.
 12. The reader shall have a configurable hold input, which when asserted shall either buffer a single card read or disable the reader, until the line is released. This input may be used for special applications or with loop detectors.
 13. Access control data shall be protected using 64-bit diversified security keys, encrypted RF data transmission, and mutual authentication using a proprietary symmetrical key-based algorithm.
 14. Security keys in the cards and readers shall be required to match, and may be customized for individual sites by using the iCLASS CP400 Access Credential Encoder (or equivalent) or by special order from the factory.
 15. The reader shall have flash memory to allow future feature enhancements to be added in the field.
 16. The reader shall have a lifetime warranty against defects in materials and workmanship.
 17. Color shall be black.
 18. HID R10, no substitutions.
- D. RK40 - Contactless Smart Card Reader with Keypad, Wall Mounting (Single-Gang Mounting Applications) Provide “single-gang” mounting style contactless smart card readers for wall mounting, Vehicle Stanchions and Pedestals, and where shown on plans.
1. The reader shall be of potted, polycarbonate material, sealed to a NEMA rating of 4X (IP65).

2. The reader shall contain an integral magnet for use with an external magnetic reed switch to provide tamper protection when connected to an external alarm system.
3. The reader shall be UL/C 294 listed, and shall be FCC and CE certified, and shall conform to the following ISO Standards: 15693, 14443A (CSN read-only), 14443B1 (read-only), and 14443B2.
4. Transmit Frequency: 13.56 MHz
5. The reader shall have an approximate read range of 1”- 4.5” when used with the compatible access card.
6. The reader shall require that a card, once read, must be removed from the RF field for one second before it will be read again, to prevent multiple reads from a single card presentation and anti-passback errors.
7. The reader shall be capable of reading access control data from any iCLASS contactless smart card or equivalent, and transmitting that data in SIA standard Wiegand format.
8. The reader shall be capable of reading the CSN (card serial number – a permanent, unique identification number) from any MIFARE® card using the S50 chip or equivalent, and transmitting that data in SIA standard Wiegand format.
9. The reader shall have a Wiegand output port and shall operate under internal control for read-only access control applications.
10. The reader shall have separate terminal control points for the green and red LED’s, and for the audible indicator.
11. The reader shall have multiple LEDs for increased visibility.
12. The reader shall have a 12-position keypad, with metal keycaps, and backlighted numbers located above each key.
13. The reader keypad shall be rugged, waterproof and backlit, and impervious to liquid spills, dirt, and water spray from any direction.
14. The reader shall be configurable so that keypad data may be sent as individual keystrokes or buffered and formatted in a card data format, as required by the Host System.
15. The reader shall allow users to enter a PIN code as a primary, secondary or alternate means of identification, based on configuration of the Host System.
16. The reader shall optionally be configurable to verify the user’s PIN entry locally, based on a comparison with PIN data stored on the user’s card, transmitting Wiegand data to the host only if the PIN code is valid.
17. The reader keypad shall have keys of sufficient size and with sufficient separation such that users wearing gloves can easily press the individual keys.
18. The reader keypad shall work in conjunction with the audio transducer, such that each keypress shall produce a click or beep signifying that the keypress was received by the microprocessor.
19. The reader keypad should have definite tactile “snap” when depressed, giving the user confirmation that the key was pressed correctly.
20. The reader shall have an audio transducer capable of providing unique tone sequences for various status conditions.
21. The reader shall have a configurable hold input, which when asserted shall either buffer a single card read or disable the reader, until the line is released. This input may be used for special applications or with loop detectors.
22. Access control data shall be protected using 64-bit diversified security keys, encrypted RF data transmission, and mutual authentication using a proprietary symmetrical key-based algorithm.

23. Security keys in the cards and readers shall be required to match, and may be customized for individual sites by using the iCLASS Card Programmer (or equivalent) or by special order from the factory.
24. The reader shall have flash memory to allow future feature enhancements to be added in the field.
25. The reader shall have a lifetime warranty against defects in materials and workmanship.
26. Color shall be selected by the Architect: gray, black or white.
27. HID RK40, no substitutions.

2.4 DOOR POSITION SWITCHES

A. Recessed Door Position Switch

1. Construction - totally encapsulated brushed housing.
2. Life Expectancy - Greater than 10,000,000 cycles.
3. Gap distance - 5/8" or greater for contacts on pedestrian doors; 2" or greater for overhead doors.
4. UL listing - UL listed 634 for use with security systems.
5. The door position switch shall be recessed, normally closed, with a wide gap.
6. Sentrol 1078W or Department of Aviation approved equivalent substitute.

B. Overhead Door Position Switch

1. Construction: Aluminum
2. Contact Configuration: N.O, SPDT
3. Environmental Specifications: Hermetically Sealed Reed Switch Encapsulated in Polyurethane
4. Lead Type: 3/16 Armored (A) Stainless Steel Cable with Wire Leads
5. Sentrol 2200 Series or Department of Aviation approved equivalent substitute.

C. Surface Mounted Door Position Switch

1. Construction: Aluminum
2. Electrical Configuration: SPDT
3. Lead Type: 3' 3/16" Armored Cable
4. Sentrol 2500 Series or Department of Aviation approved equivalent substitute

2.5 ELECTRIC LOCKS

- A. Contractor and contractor's subcontractors ***shall*** coordinate with door hardware provider to ensure the following options are coordinated and provided.

A.B. Electrified Mortise Lock:

1. Replaceable breakaway spindle.
2. Solid stainless steel 1.5" deadbolt with 1" throw.
3. Reversible handing without disassembly (lock case is not required to be opening in order to reverse).

4. Universal lock chassis.
5. Free-wheeling lever to resist force when locked.
6. Independent heavy duty spring cage for level support.
7. Interchangeable core compatible with master keying, grand master keying and construction keying. Furnish core that is compatible with existing HAS Master cores (Best Series V Core).
8. Furnish with ADA compliant lever set that is consistent with building standards.
9. Lockset shall include request-to-exit feature and fail secure design.
10. Furnish with switch for monitoring of the retractor crank. Switch to be activated when rotation of the lever rotates the retractor hub.
11. Inside lever must allow immediate egress.
12. Electric Lock: Best Model 45 or Department of Aviation approved equivalent.

~~B.C.~~ Electric Strikes

1. Stainless Steel ANSI size Faceplate
2. Frame Type - Hollow Metal or Aluminum
3. Corrosion - Resistant case and moving parts
Tamper Strength Test - 1700 lbs (765kg)
4. Cycle Test 500,000 cycles
5. Keeper Depth - 5/8" Maximum Latch Projection possible with 1/8" Door/Frame Clearance - 3/4"
6. Strike Depth 1.50" Overall
7. Handed - When ordering indicate RH or LH
8. ANSI/BHMA A 156.5 (1-1/4" x 4-7/8"), fits cutout Specification A 115.1 (with slight jamb modification)
9. Keeper Opening 3/8" below center line
10. Electric Strike: ROFU or approved Department of Aviation approved equal.

~~C.D.~~ Magnetic Lock: Provide magnetic lock complete with necessary mounting brackets, adapter plates, and mounting hardware. Locks shall have the following features and characteristics:

1. Construction - lock body constructed of steel with aluminum finish. Strike plate constructed of 1/2" cadmium plated steel.
2. Holding force - 1200 lbs. or greater for doors without panic hardware, 500 lbs. or greater for doors equipped with panic hardware.
3. Mounting - surface mounted on frame and door. Provide brackets and Adapters as required.
4. Power - 24 VDC, not more than 0.2 amps for 500 lb. Units and not more than 0.5 amps for the 1200 lb. units.
5. Door Status Sensing (optional) - Dry contact closure to the Intelligent Field Panel or Reader/or reader controls to indicate that the magnetic bond is present between the lock and the strike plate.
6. Remote Control - Accept control via power interruption from the Intelligent Field Panel or reader (or reader controller) to lock/unlock the door.
7. Electromagnetic locks shall be ROFU or Department of Aviation approved equivalent.

~~D.E.~~ Electric Power Transfer: The electrical power transfer shall provide a means of transferring electrical power from a door frame to the edge of a swinging door. Provide with the following minimum features:

1. The unit shall be completely concealed when the door is in the closed position.
2. The unit shall provide access for up ten (10) 24 AWG wires, up to 1 amp at 24VDC with a maximum surge of 16 amps.
3. The unit shall be UL listed for use on fire doors.
4. Von Duprin model EPT-10 or Department of Aviation approved equivalent substitute.
5. Electrified hinges shall not be acceptable.

~~E.F.~~ Electrified Panic Hardware: The panic hardware shall be suitable for emergency/fire exit and provide optional delayed-egress functionality. The unit shall include the following minimum features/functions:

1. The unit shall be permit connection to the fire alarm system for immediate release upon alarm condition.
2. All controls, auxiliary locking, local alarm and remote signaling output shall be self contained inside the unit.
3. The unit shall be installed with an electric mortise lock when electric locking is required.
4. The unit shall provide a request-to-exit feature to detect when someone attempts to exit. The feature will active when a force of less than 15 pounds is applied.
5. An option shall be included so that alarming does not occur for a period 2 seconds pf pressure on the unit to avoid nuisance alarming. This shall be a selectable feature capable of being turned off for immediate alarming.
6. The unit shall be installed with a minimum of three relays. One relay shall be tied into an external audible alarm. One relay shall be tied into an external visual alarm and one relay shall be spare.
7. The unit shall include a key switch for alarm reset, arm or disarm.
8. The delay time shall be a programmable feature from 0 to 60 seconds as defined by the user.
9. Von Duprin CHEXIT #9975L-F0E0 or Department of Aviation approved equivalent substitute.

~~2.6 LOCK POWER SUPPLIES~~

~~A. Rack Mounted Power Supply: Provide 24VDC power supply~~

- ~~1. 12 amp @ 12VDC and/or 24VDC output.~~
- ~~2. 2.0 amp max. current per output.~~
- ~~3. Sixteen (16) fuse protected non power limited outputs.~~
- ~~4. 115VAC 50/60Hz. Input Normally closed [NC] or normally open [NO] dry contact inputs (switch selectable).~~
- ~~5. Individually selectable, Mag Lock/Strike (Fail-Safe, Fail-Secure) solid state fuse protected power outputs.~~
- ~~6. Fire Alarm disconnect (latching with reset or non-latching) is individually selectable for any or all of the outputs.~~
- ~~7. Fire Alarm disconnect input options:
 - ~~a. Normally open [NO] or normally closed [NC] dry contact input.~~
 - ~~b. Polarity reversal input from FACP signaling circuit.~~~~
- ~~8. Remote reset capability for latching Fire Alarm Interface mode~~
- ~~9. Filtered and electronically regulated outputs.~~

- ~~10. Short circuit and thermal overload protection.~~
- ~~11. Removable terminal blocks with locking screw flange.~~
- ~~12. 3-wire line cord.~~
- ~~13. Illuminated master power switch.~~
- ~~14. Built-in charger for sealed lead acid or gel type batteries.~~
- ~~15. Zero voltage drop upon transfer to battery backup.~~
- ~~16. Automatic switch over to stand-by battery when AC fails.~~
- ~~17. AC fail, low battery and battery presence supervision.~~
- ~~18. Individual output status LEDs located on the front panel.~~
- ~~19. Lifetime warranty~~
- ~~20. Modular 2U standard EIA 19" rack mount chassis.~~
- ~~21. Dimensions: 3.25"H x 19.125"W x 8.5"D.~~
- ~~22. Allow 1/2U space on top and bottom of the unit for ventilation.~~
- ~~23. AlarmSaf or Houston Airport System approved equivalent substitute.~~

2.6 LOCK POWER SUPPLIES

- A. Rack Mounted Power Supply: Provide 24VDC power supply
1. 12 amp @ 12VDC and/or 24VDC output.
 2. 2.0 amp max. current per output.
 3. Sixteen (16) fuse protected non-power limited outputs.
 4. 115VAC 50/60Hz. Input Normally closed [NC] or normally open [NO] dry contact inputs (switch selectable).
 5. Individually selectable, Mag Lock/Strike (Fail-Safe, Fail-Secure) solid state fuse protected power outputs.
 6. Fire Alarm disconnect (latching with reset or non-latching) is individually selectable for any or all of the outputs.
 7. Fire Alarm disconnect input options:
 - a. Normally open [NO] or normally closed [NC] dry contact input.
 - b. Polarity reversal input from FACP signaling circuit.
 8. Remote reset capability for latching Fire Alarm Interface mode
 9. Filtered and electronically regulated outputs.
 10. Short circuit and thermal overload protection.
 11. Removable terminal blocks with locking screw flange.
 12. 3-wire line cord.
 13. Illuminated master power switch.
 14. Built-in charger for sealed lead acid or gel type batteries.
 15. Zero voltage drop upon transfer to battery backup.
 16. Automatic switch over to stand-by battery when AC fails.
 17. AC fail, low battery and battery presence supervision.
 18. Individual output status LEDs located on the front panel.
 19. Lifetime warranty
 20. Modular 2U standard EIA 19" rack mount chassis.
 21. Dimensions: 3.25"H x 19.125" W x 8.5" D.
 22. Allow 1/2U space on top and bottom of the unit for ventilation.
 23. Altronix (Maximal) Rack mount series:

- a. *Maximal3RD (12VDC or 24VDC @6A) 16 outputs or Houston Airport System Approved equivalent substitute.*
- b. *Maximal33RD (12VDC or 24VDC @12A) 16 outputs or Houston Airport System Approved equivalent substitute.*

2.7 REQUEST-TO-EXIT DEVICE:

- A. UL listed
- B. Complies with current City of Houston Building Codes.
- C. 2 5/8" Red Mushroom Button mounted to single gang backbox
- D. Momentary DPST switch contacts
- E. Security Door Controls 440 Series or approved equivalent

2.8 DURESS ALARM SWITCH

- A. SPDT switch in surface mounted plastic housing
- B. Switch remains activated until reset with key
- C. Ademco Model 268 or approved equivalent

2.9 COMPOSITE SECURITY CABLE

- A. Cabling between controlled portals and IFPs shall consist of multiple conductor bundles affixed together via a central spline. The conductor bundles shall consist of the following:
 1. 4C, 18 AWG 16/30 STR, shielded
 2. 3P, 22 AWG 7/30 STR, shielded
 3. 2C, 22A AWG 7/30 STR, shielded
 4. 4C, 22 AWG 7/30 STR, shielded
- B. The composite access control cable shall be Genesis 3295 or approved equivalent for cables up to 150 feet in length.
 1. Cables between controlled portals and IFPs with lengths from 150 to 240 feet shall include an additional one (1) 16 AWG 2/C Shielded CMP-CL2P, Genesis 3221 by contractor used for lock power.
 2. Cables between controlled portals and IFPs between 240' and 400' shall include an additional (1) 12 AWG 2/C STR Shielded CMP-CL2P Genesis 3225 by contractor.

2.10 AUDIBLE/VISUAL (A/V) DEVICE:

- A. 12/24 volts,
- B. 8 candela settings: 15/1575/30/75/95/110/135/185
- C. multiple sound settings: 90, 95, 99 dB
- D. Labeled as “Security” or no label. Device cannot say “Fire Alarm.”
- E. UL listed
- F. Complies with current City of Houston Building Codes.
- G. Cooper Wheelock HSW or HAS approved equal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install components in accordance with contract drawings, manufacturer’s instructions and approved submittal data.
- B. System installation and construction methods shall conform to the requirements of the Federal Communications Commission.
- C. Install all system components including furnished equipment, and appurtenances in accordance with the manufacturer's instructions, and adjustments required for a complete and operable system.
- D. Grounding shall be installed as necessary to preclude ground loops, noise, and surges from adversely affecting system operation.
- E. Coordinate with Owner to obtain inspection and approval of all cable raceway prior to installation of cable.

3.2 PRODUCT HANDLING

- A. The Contractor shall be responsible for any and all loss or damage in the shipment and delivery of all material until transfer of title to the City.

3.3 HARDWARE INSTALLATION

- A. Unless otherwise specified herein, or shown on the drawings, provide electrified mortise locks, electric strikes or electrified panic hardware. Provide electromagnetic locks only upon receipt of written authorization from HAS.

- B. Unless otherwise specified herein, or shown on the drawings, provide end-of-line resistor packs at field device (door position switched, tamper switches, duress alarm switches, etc.) contacts as required for continuous supervision of field device cable. Resistor packs shall be located to maximize cable supervision. Resistor packs shall be configured to produce discreet annunciation of open and short conditions.
- C. The Contractor shall take all steps necessary to ensure that all public areas remain clear or are properly marked during installation or maintenance.
- D. The contractor shall place materials only in those locations that have been previously approved. The City Engineer shall approve any other locations, in writing.

3.4 CONFIGURATIONS

- A. Definitions of the alarm status signals are:
 - 1. Authorized Card – Valid card has been presented. Central System logs event and approves unlock.
 - 2. Undefined Card – A card that is not in the system has been presented (used to detect lost or stolen cards). Central System logs event and disapproves unlock and reports alarm event.
 - 3. Invalid Area – Card has been presented at a reader that is not a part of the readers assigned to that card. Central System logs event and disapproves unlock and reports alarm event.
 - 4. Invalid Time Period – Card has been presented at a time that is not defined in the system as a valid time assigned to that card. Central System logs event and disapproves unlock and reports alarm event.
 - 5. Expired Card – Card that is presented has been programmed to be inactive after a specific date. Central System logs event and disapproves unlock and reports alarm event.
 - 6. Inactive Card – Card that is programmed in the system as inactive is presented. Central System logs event and disapproves unlock and reports alarm event.
 - 7. Door Held Open Alarm – A door is held open longer than the programmed time. Alarm event is sent to Central System.
 - 8. Forced Door Alarm – A door that has been opened without presenting a valid card or PIN code and received an unlock command. Alarm event is sent to Central System.
 - 9. Door Restore – The door has been closed and condition has returned to normal and event is sent to Central System.
- B. Install each configuration listed below found on drawings with the appropriate functional description and alarm/status signals.
 - 1. Type 1 – single door, single card reader, door contacts, electric panic hardware w/time delay release. Security horn/strobe (Audible/Visual Device), REX, EPT.
 - 2. Type 2 – Double door, single card reader, door contacts, electric panic hardware w/time delay release, horn/strobe (Audible/Visual Device), REX, EPT.
 - 3. Type 3 – single door, single card reader, door contacts, Mortise locks w/integral REX, EPT.
 - 4. Type 4 – Double door, single card reader, door contacts, Mortise locks w/integral REX, EPT.
 - 5. Type 5 – Double door, door contacts, Security horn/strobe (Audible/Visual Device), EPT.

6. Type 6 – Double door, single card reader, door contacts, Magnetic locks, REX.

3.5 SYSTEM STARTUP

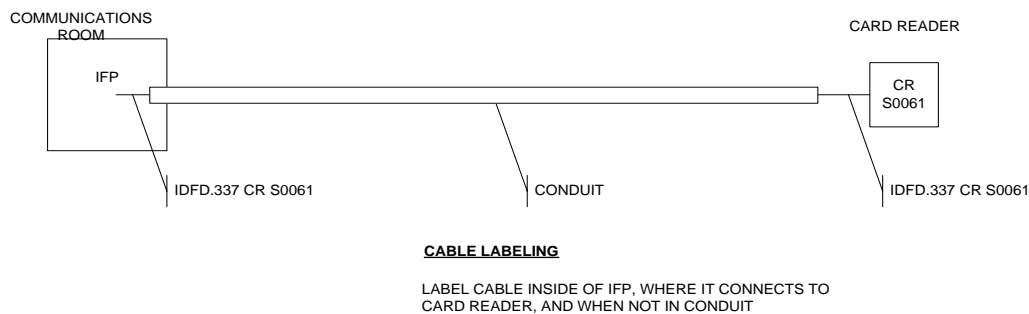
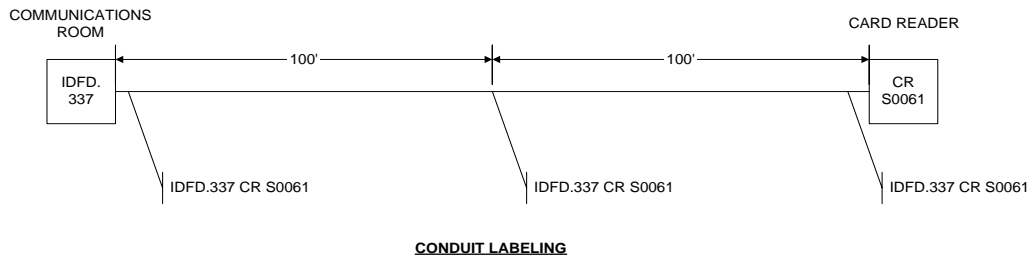
- A. Submit completed Programming Worksheet for Reader Interface Details prior to startup. Reference section 3.9
- B. Submit completed Programming Worksheet for I/O Details prior to startup. Reference Section 3.9.
- C. Submit completed IFP Installation Checklist prior to Startup. Reference Section 3.9.
- D. The Contractor shall not apply power to the system until after:
 1. System and components have been installed and inspected in accordance with the manufacturer's installation instructions.
 2. A visual inspection of the system components has been conducted to ensure that defective equipment items have not been installed and that there are no loose connections.
 3. System wiring has been tested and verified as correctly connected as indicated.
 4. All system grounding and transient protection systems have been verified as properly installed and connected, as indicated.
 5. The City Engineer and the HAS Representative have approved the installation.
- E. Satisfaction of the above requirements shall not relieve the contractor of responsibility for incorrect installations, defective equipment items, or collateral damage as a result of contractor's deficient work/defective equipment.

3.6 ACCEPTANCE TESTING

- A. The contractor shall develop and execute an onsite acceptance-testing program.
- B. The plan shall address all requirements identified in this specification and test all contractor supplied cabling and hardware components. The plan shall follow accepted industry testing practices and have a method of independent verification described.
- C. Any specified item that does not satisfy the requirements of this specification shall be replaced, upgraded, or added by the contractor as necessary to correct the noted deficiencies. After correction of a noted deficiency, re-testing shall be performed to verify the effectiveness of the corrective action.

3.7 IDENTIFIERS, LABELS AND LABELING SYSTEM

- A. Label each card reader on the card reader spacer. Label shall be permanently engraved on a Lexan back plate. The label shall include the card reader number. Coordinate with HAS for sample.
- B. Cable and Conduit Labeling:



3.8 RECORD DRAWINGS

- A. Site Prints: Maintain a set of clearly marked black-line prints of the Construction Documents at the job site which shall be used for recording the work details, final size, location, interrelation, and similar items of all work under this Division. This set of Construction Documents shall be corrected daily as the work progresses and shall clearly indicate all changes to suit field conditions, changes made by “Field Order” or “Change Order,” accurate dimensions of all buried or concealed work. Precise locations of all concealed work, locations of all concealed boxes, controls and devices and any deviations from the work shall be referenced by at least two permanent structure points.
- B. Upon completion of work, incorporate into AutoCAD (Ver. 2010) all marks from site prints and produce two bound sets of draft Record Drawings for use and verification during acceptance testing. The draft Record Drawings shall utilize the latest Architectural background drawings and shall incorporate all modified drawings as outlined in Article 1.04 of this Section, or any other drawings which were developed during the installation process. Any changes to the required Record Drawings as a result of acceptance testing shall be redlined on these sets as required.
- C. Upon completion of acceptance testing, incorporate into CAD files (Ver. 2010) all marks from the site prints, including any revisions made to the drawings outlined in Section 1.04 (Submittals) of this Section. Produce one set of clean Record Drawings on vellum and one complete set of Record Drawings burned to CD-ROM.

3.9 SYSTEM START-UP WORKSHEETS

A. Reader Interface Details

PW6000 READER INTERFACE DETAILS						
Site / Building	Panel Name *	IP Address**	Mac Address			
Panel	Card Slot# (Physical) ***	Address (dip Switch)				
Card Reader Name:						
Location:						
Check Box if applicable						
Reader	0	Function	Open	Closed	Supervised	Unsupervised
IN	0	Door status input (default)		X	X	
	1	REX input (default)				
			N.O.	N.C.	Energized	De-energized
OUT	0	Door lock (default)		X	X	
	1					
Check Box if applicable						
Card Reader Name:						
Location:						
Check Box if applicable						
Reader	0	Function	Open	Closed	Supervised	Unsupervised
IN	0	Door status input (default)		X	X	
	1	REX input (default)				
			N.O.	N.C.	Energized	De-energized
OUT	0	Door lock (default)		X	X	
	1					
Check Box if applicable						
Aux	Function	Open	Closed	Supervised	Unsupervised	
IN	4					
	5					
	6					
	7					
		N.O.	N.C.	Energized	De-energized	
OUT	4	Open	Closed	Supervised	Unsupervised	
	5					
	6					
	7					
Submitted By (Contractor):					Date:	
Programmed By:					Date:	
Naming Convention (must be adhered to)						
* Panel Name – Provided by HAS IT						
** Obtain IP Address from HAS IT						
*** Card slot shall be represented as 0, 1, 2, . . . , 8. Where the (0) represents the IC board and 1-8 represent the Dual Reader Board. Numbering is from right to left. Slot 0 is reserved for the Intelligent Controller (IC) board.						

B. I/O Details

PW6000 INPUT/OUTPUT MODULE DETAILS								
Site / Building	Panel Name *	IP Address**	Mac Address					
<table border="1" style="margin: auto;"> <tr> <td style="width: 50px;">Card Slot#</td> </tr> <tr> <td> </td> </tr> </table>							Card Slot#	
Card Slot#								
(Check Box if applicable)								
Input	Function	Open	Closed	Supervised	Unsupervised			
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<table border="1" style="margin: auto;"> <tr> <td style="width: 50px;">Card Slot#</td> </tr> <tr> <td> </td> </tr> </table>							Card Slot#	
Card Slot#								
(Check Box if applicable)								
Input	Function	N.O.	N.C.	Energized	De-energized			
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Naming Convention (must be adhered to)								
* Panel Name – Provided by HAS IT								
** Obtain IP Address from HAS IT								
*** Card slot shall be represented as 0, 1, 2, . . . , 8. Where the (0) represents the IC board and 1-8 represent the Dual Reader Board. Numbering is from right to left. Slot 0 is reserved for the Intelligent Controller (IC) board.								

C. IFP Installation Checklist

ITEM	ACCESS CONTROL SYSTEM EQUIPMENT CHECKLIST	CHECK	DATE
1	FP AND POWER SUPPLIES ARE SECURED TO WALL OR CABINET WITH 4 SCREWS EACH		
2	BACKUP BATTERY INSTALLED IN FP AND POWER SUPPLY		
3	AC FAIL, BATTERY FAIL, PANEL TAMPER CONNECTED TO AUX INPUTS ON DRI		
4	FP AND POWER SUPPLIES BONDED TO TGB WITH #12AWG GROUND CONDUCTOR		
5	PORTAL CABLES LABELED AT DRI		
6	PORTAL CABLES DRESSED NEATLY		
7	WIRE GROMMETS INSTALLED WHERE CABLES ENTER FP		
8	FP AND POWER SUPPLY HARD WIRED VIA CONDUIT TO PANELBOARD		
9	FP AND POWER SUPPLIES LABELED ON OUTSIDE		
11	PLYWOOD IS SECURED TO CABINET EVERY 6 INCHES. TOGGLE BOLTS NOT ALLOWED		
12	POWER SUPPLIES ARE CORRECT SIZE. CHECK DRAWINGS		
13	CABLE RESTRAINTS AND GROMMETS INSTALLED ON POWER SUPPLIES		
14	PORTAL CABLES LABELED IN POWER SUPPLIES		
15	TAMPER SWITCH INSTALLED ON EQUIPMENT CABINET, FP, AND POWER SUPPLIES		
16	TERMINATION BLOCKS LABELED		
17	CABLE ON BOTH SIDES OF TERMINATION BLOCK LABELED		
18	SPLICES LABELED ON BOTH SIDES OF SPLICE		
19	SCREWS SHOULD NOT PENETRATE THROUGH PLYWOOD BACKBOARD		
20	ACCESS CONTROL CABLING DRESSED PROFESSIONALLY AND NEATLY IN ENCLOSURES AND EQUIPMENT CABINETS		
21	DOCUMENTATION PROVIDED IN CLEAR ENVELOPE IN FP. CONTENTS TO INCLUDE, FP DRAWING, WIRING DIAGRAMS, MAP OF ALL CARD READERS FED FROM ROOM		
22	FIRE ALARM INTERFACE ON LOCK POWER SUPPLY		
23	DEMOLISHED EQUIPMENT NEED TO BE REMOVED FROM WALL OR CABINET		
24	DEMOLISHED/ABANDONED CABLES NEED TO BE REMOVED PER LOCAL CODE		
25	EQUIPMENT, CABINETS, AND ENCLOSURES FREE FROM DUST, TRASH, AND DEBRIS		
26	POWER CORDS LABELED AT RECEPTACLE IF APPLICABLE		
27	POWER STRIP SECURED PROPERLY		
28	POWER SUPPLIES LATCHED CLOSED		
29	EACH FP ENCLOSURE HAS INDIVIDUAL POWER SUPPLY		
30	CONFIRM CORRECT QUANTITY OF DRI AND I/O		
	CONTRACTOR SIGNATURE:	DATE:	

END OF SECTION 281300