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SECTION 28 10 00

ACCESS CONTROL

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Access Control system
- B. Related Requirements:
 - 1. Section 27 15 01.15 Access Control Communications Conductors and Cable
 - 2. Section 28 05 00 Common Work Results for Electronic Safety and Security
 - 3. Section 28 05 53 Identification for Electronic Safety and Security

1.02 REFERENCES

- A. Abbreviations and Acronyms:
 - 1. GB Gigabyte
 - 2. HDD Hard Disk Drive
 - 3. ICAM Identity, Credential, and Access Management
 - 4. IP Internet Protocol
 - 5. ISO International Organization for Standardization
 - 6. MB Megabyte
 - 7. Mbps Megabits per second
 - 8. OSDP Open Supervised Device Protocol
 - 9. PACS Physical Access Control System
 - 10. PIV Personal Identity Verification
 - 11. PoE Power over Ethernet
 - 12. RAM Random Access Memory
 - 13. UL Underwriters Laboratories
 - 14. VDC Volts Direct Current

B. Reference Standards:

- ANSI/BICSI 005-2016, Electronic Safety and Security (ESS) System Design and Implementation Best Practices
- 2. ANSI/TIA-5017, Telecommunications Physical Network Security Standard
- 3. IBC (currently adopted edition)
- 4. NFPA 70®, National Electrical Code® (NEC) (currently adopted edition)
- 5. UL 294, Standard for Access Control System Units
- 6. UL 1034, Standard for Burglary-Resistant Electric Locking Mechanisms

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1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

- 1. Coordinate work with Electrical contractor and Owners:
 - a. Credential reader locations.
 - b. Enclosure locations
 - c. Power requirements and locations
 - d. Door hardware.
- 2. Coordinate work with the Owner:
 - a. IP address requirements

1.04 ACTION SUBMITTALS

A. Product Data:

- 1. Submit product data in .pdf format for review no later than 60 days before beginning work.
 - a. Credential readers.
 - b. Door controllers
 - c. Enclosures
 - d. Hardware
 - e. Power supplies
 - f. Panic/Emergency push buttons.

B. Shop Drawings:

- 1. Submit shop drawings in .pdf format, similar to the contract drawings, for review no later than 60 days before beginning work.
 - a. Credential reader locations.
 - b. Door controller locations
 - c. Panic/Emergency push button locations.
- C. See Section 28 05 00 Common Work Results for Electronic Safety and Security, for submission requirements.

1.05 INFORMATIONAL SUBMITTALS

A. Permits:

1. Submit a copy of permits required by the State of Alaska, city, or county of the project location.

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1.06 CLOSEOUT SUBMITTALS

- A. Format:
 - 1. See Section 28 05 00 Common Work Results for Electronic Safety and Security, for additional information.
- B. Operation and Maintenance Data:
 - 1. Submit Operation and Maintenance manuals for the Access Control system.
- C. Record Documentation:
 - 1. As-builts:
 - a. Include the following information:
 - 1) Credential reader locations.
 - 2) Door controller locations
 - 3) Panic/Emergency push button locations.
 - 2. Installation matrix:
 - a. Submit matrix with IP addressed nodes.
- D. Software:
 - 1. Supply licensing and registration information, for software, hardware, firmware, operational, and administrative licenses.
- 1.07 WARRANTY
 - A. Manufacturer Warranty:
 - 1. Credential readers and door controllers shall have a warranty period of not less than 1 year.

PART 2 - PRODUCTS

2.01 COMPONENTS

- A. Manufacturers:
 - Credential readers:
 - a. 120-600200 MGI EV2-2K bluetooth reader, Mifare Desfire EV2 format fob: 065-600700 MGI Mifare keyfob
 - 2. Door Controllers:

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- a. Millennium
 - 1) EDCD-2: 2 door enhanced door control devices.
 - 2) NET2: 2 door network control devices.
 - 3) PS1: 100213-001 power supplies.
- 3. Enclosures:
 - a. Millennium
 - 1) Large enclosure for up to 12 two door controllers (24 doors).
 - a) Model: 062-510300 w/power supply.
 - b) Model: 062-520300 no power supply.
 - 2) Up to 3 two door controllers (6 doors).
 - a) Model: 062-510235
- 4. Licensing:
 - a. Millennium
- 5. Substitutions: No substitutions.
- B. Electrified Locks:
 - 1. HES 8000 Series.
 - 2. Altronix Lock Power supplies.
 - a. Model SMP3PMP16.
 - b. Model SMP3PMP8.
 - c. Model SMP3PMP4.
 - 3. Substitutions: With approval from Consultant and Owner.
- C. Emergency Push Button:
 - 1. George Risk Industries:
 - a. Model: GRI 3045 Panic Switch
 - 2. Substitutions: No substitutions.

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PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:

- 1. Verify telecommunications rooms are completely built and wrapped in plywood before beginning work. Verify power is in place.
- 2. Verify doors and door jambs are prepared and ready for hardware installation.
- 3. Verify reader rough-in is complete.

3.02 INSTALLATION

A. Systems Integration:

- 1. The Access Control server shall be loaded with software and licenses, installed on-site, and ready for Owner configuration.
- 2. Develop, install, and test software and databases for complete and proper operation of systems involved. Activate and install software and accessory software licenses.
- 3. Setup and program entire system so that no additional programming is required after substantial completion, including setup of available software features.
- 4. Perform a full system backup at completion of initial programming session to verify operating parameters and sequence of operations based on revisions to Owner operating requirements, including the creation of time schedules, holidays, new card formats, and other requested requirements.
- 5. Ensure products are equipped with the latest and most up-to-date firmware or software by the manufacturer.
- 6. Review configurable features of devices with Owner and establish a list for standard, device specific, location specific, and software specific configuration of devices.
- 7. Configure equipment requiring users to log on using a password with user-specific passwords. System or default passwords are not permitted.
- 8. Install door controllers as indicated on the contract drawings.
- 9. Connect door controllers to a PoE+ telecommunications outlet. Verify power and connectivity.
- 10. Upon presentation of a credential, the door controller will either approve or deny entry with a corresponding record of the action.
- 11. The Access Control system shall be complete and fully functional by the date of substantial completion.
- 12. Bond metallic door controller enclosures to the nearest bonding busbar or building steel.
- 13. Seek written approval before installing the Access Control system in a manner that deviates from the contract drawings.

3.03 FIELD QUALITY CONTROL

A. Field Tests and Inspections:

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1. Tests:

a. Test Access Control system for complete functionality.

2. Inspections:

- a. Inspection of correct installation practices is the responsibility of the Project Manager.
- b. Provide availability for inspections with the Owner, Architect, or Consultant, including a final inspection, at mutually agreed-upon times.
- c. The Owner or Consultant may elect to verify data as part of the acceptance procedures. Provide personnel and equipment to test the system at no additional expense.

3.04 CLOSEOUT ACTIVITIES

A. Demonstration:

- 1. Demonstrate the features and operation of the Access Control system to the appropriate personnel. Provide 2 hours of demonstration time to Owner designated personnel on the use and operation of the system. The instructor shall be fully knowledgeable and qualified in system operation.
- 2. The demonstration must be provided in accordance with a schedule acceptable to the Owner.

B. Training:

- 1. Train appropriate personnel in the operation and maintenance of the Access Control system. Provide 2 hours of demonstration time to Owner designated personnel on the use and operation of the system. The instructor shall be fully knowledgeable and qualified in system operation.
- 2. The training must be provided in accordance with a schedule acceptable to the Owner.

END OF SECTION 28 10 00

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SECTION 27 15 01.15

ACCESS CONTROL COMMUNICATIONS CONDUCTORS AND CABLES

PART 1 - GENERAL

- 1.01 SUMMARY
 - A. Section Includes:
 - 1. Reader control cable.
 - 2. Low voltage power cable.
 - 3. Emergency/Panic button cable.
 - B. Related Requirements:
 - 1. Section 28 10 00 Access Control
- 1.02 REFERENCES
 - A. Abbreviations and Acronyms:
 - 1. AWG American Wire Gauge
 - 2. CMP Communications Multipurpose cable, Plenum
 - 3. EMI Electromagnetic Interference
 - B. Reference Standards:
 - ANSI/BICSI 005-2016, Electronic Safety and Security (ESS) System Design and Implementation Best Practices
 - 2. ANSI/TIA-5017, Telecommunications Physical Network Security Standard
 - 3. NFPA 70®, National Electrical Code® (NEC) (currently adopted edition)
- 1.03 ADMINISTRATIVE REQUIREMENTS (NOT USED)
- 1.04 ACTION SUBMITTALS
 - A. Product Data:
 - 1. Submit product data in .pdf format for review no later than 60 days before beginning work.
 - a. Reader control cable.
 - b. Low voltage power cable.
 - c. Emergency/Panic button cable.

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- B. Shop Drawings: (Not used)
- C. See Section 28 05 00 Common Work Results for Electronic Safety and Security, for submission requirements.
- 1.05 INFORMATIONAL SUBMITTALS (NOT USED)
- 1.06 CLOSEOUT SUBMITTALS (NOT USED)
- 1.07 QUALITY ASSURANCE (NOT USED)

PART 2 - PRODUCTS

2.01 COMPONENTS

- A. Manufacturers:
 - Belden
 - 2. Southwire
 - 3. West Penn
 - Windy City Wire
- B. Cable Description:
 - 1. 22 AWG / 3 pair overall shield (credential reader)
 - 2. 18 AWG / 2 conductor shielded (lock power)
 - 3. 18 AWG / 2 conductor shielded (panic buttons)
 - 4. 22 AWG / shielded twisted pair w/22 AWG ground (485 communications to be routed through controller power supplies.
- C. Substitutions: Submit for approval.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verification of Conditions:
 - Verify pathways are complete and free of obstructions before installing cable. Access control cable shall share pathways with other low voltage system cabling unless otherwise noted.
- 3.02 INSTALLATION
 - A. Systems Integration:

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- 1. Provide the correct environmentally rated cable for each application.
- 2. Install cable in a neat and professional manner.
- 3. Avoid abrasion and other damage to cables during installation. Cables that are damaged or deformed shall immediately be removed and replaced without additional expense.
- 4. Cable splices are not permitted without prior approval.
- 5. Cross electrical power at right angles.
- 6. Install cable with proper separation between EMI sources. Provide a minimum of 2-inch separation between power crossing at right angles.

3.03 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Tests: (Not used)
 - 2. Inspections:
 - a. Inspection for correct Access Control cabling and terminations is the responsibility of the Integration Manager.
- 3.04 CLOSEOUT ACTIVITIES (NOT USED)

END OF SECTION 27 15 01.15

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SECTION 28 05 00

COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

- 1. References
- 2. Administrative Requirements
- 3. Action Submittals
- 4. Informational Submittals
- 5. Closeout Submittals
- 6. Quality Assurance
- 7. Delivery, Storage, and Handling
- 8. Warranty
- 9. Components
- 10. Examination
- 11. Installation
- 12. Field Quality Control
- 13. Cleaning
- 14. Closeout Activities

1.02 REFERENCES

A. Abbreviations and Acronyms:

- 1. AHJ Authority Having Jurisdiction
- 2. ANSI American National Standards Institute
- 3. BICSI Building Industry Consulting Services International
- 4. CCTV Closed Circuit Television
- 5. ESS Electronic Safety and Security
- 6. ISO International Organization for Standardization
- 7. NFPA National Fire Protection Association
- 8. OSHA Occupational Safety and Health Administration
- 9. TIA Telecommunications Industry Association

B. Definitions:

- 1. As-built The documentation of measurements, location, and quantities of material work performed.
- 2. Comply To conform, submit, or adapt as required or requested.

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3. Consultant – A specialist who provides services to the design team that is headed up by an architect or engineer who is under contract with a client.

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- 4. Contract A written document covering the understanding between the customer and the contractor.
- 5. Contract documents Plans, specifications, and other documents that together set forth the requirements of the contract and become legally enforceable when the agreement is signed. Executed agreements between the owner and contractor that become part of a contract when the agreement is signed.
- 6. Coordinate To bring into a common action, movement, or condition.
- 7. Furnish To supply and deliver to the project site, ready for installation.
- 8. Install To place in a position of service or use.
- 9. Provide To furnish and install, complete and ready for intended use.
- 10. Punch list A short list of tasks that are required to be completed in order to close out a work order of project.
- 11. Shall Frequently used in codes and standards publications, the term indicates a mandatory requirement.
- 12. Should Indicates a recommendation or that which is advised but not required.
- 13. Submittal Information, documentation, or samples that a contractor may be requested to submit to the design team for review and approval before the commencement of work.
- 14. Substantial completion A stage of construction or a building project that is sufficiently complete, in accordance with the contract documents, so that the owner may use the installed equipment.

C. Reference Standards:

- 1. ANSI/BICSI 005-2016, Electronic Safety and Security (ESS) System Design and Implementation Best Practices
- 2. ANSI/TIA-5017, Telecommunications Physical Network Security Standard
- 3. NFPA 70®, National Electrical Code® (NEC) (currently adopted edition)

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

- 1. Examine drawings and specifications for the entire project. Notify the Consultant and Owner of discrepancies upon discovery.
- 2. Coordinate shut-downs, cutovers, or tie-ins with the Owner as required. Submit schedule for approval at least 2 weeks in advance.
- 3. Coordinate work with the Owner, and Subcontractors.

a. Deliverables:

- Electrical Contractor procurement to be determined by Owners and will support the Security Contractor.
 - a) Install required electric power for access control.
 - b) Install pathways for access control and panic alarms.
- 2) Security Contractor
 - a) Install all security devices per specifications and contract drawings.
- 3) Owner
 - a) Be available to contractors for site specific installation questions.

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- b. Inspections:
 - 1) **AHJ**
- Rough-in, receptacle, conduit, power, and underground pathway C. requirements:
 - 1) **Electrical Contractor**
- B. Pre-installation Meetings:
 - 1. Refer to paragraph 2.07 (Project Meetings) of the RFP.
- C. Scheduling:
 - 1. Coordinate, plan, and execute work according to the project schedule.
 - Adhere to project milestones and implementation schedule. 2.
 - 3. Refer to paragraph 2.07 (Project Meetings) of the RFP.

1.04 **ACTION SUBMITTALS**

- A. Product Data:
 - 1. Submit product data in .pdf format for review no later than 60 days before beginning work. Products ordered or installed before receiving reviewed and returned submittals are subject to removal and replacement at the Contractors expense.
 - 2. Submit product data individually for each specification section under separate cover.
 - Submit cut sheets with part numbers, model numbers, and brief descriptions. a. Clearly indicate the product on each product data sheet using yellow highlighter.
 - 3. Include a title sheet with the following information:
 - Contractor name and contact information. a.
 - Date of submittal b.
 - Project name C.
 - d. Project number
 - Sequential submittal number e.
 - f. Specification section reference
 - 4. Full-line and short-form catalogs are not acceptable.
 - 5. Remove extraneous pages, blank pages, and repeated information.
 - Keep information pertinent to technical data only and as brief as possible. 6.
 - Submittals will be reviewed for general compliance and not quantities. Individual 7. submittals reviewed more than twice are subject to back charges being levied against the Contractor.

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- 8. Combined submittals, submittals submitted under the incorrect specification section, submittals with extraneous pages, submittals with incorrect product data, or unapproved substitutions will be rejected.
- 9. Identify products with long lead times and provide anticipated ship dates that may affect the project schedule.

B. **Shop Drawings:**

- 1. Submit shop drawings in .pdf, similar to the contract drawings, for review no later than 60 days before beginning work.
- Create shop drawings from project CAD files. Shop drawings created using .pdf 2. contract drawings are not permitted.
- 3. Shop drawings are permitted to be submitted as 1 complete set per discipline.
 - a. Include device locations, elevations, and riser diagrams.
- 4. Include a title sheet with the following information:
 - Contractor name and contact information. a.
 - Date of submittal b.
 - Drawing reference C.
 - d. Project name
 - Project number e.
 - Sequential submittal number f.
- 5. Submit shop drawings on 24-inch by 36-inch (Architectural size D) sheets.
- Scale shop drawings at an appropriate scale, but not smaller than 1/8-inch equals 6.
- 7. Include sufficient information to describe the work being performed.
- Shop drawings will be reviewed for general compliance and not dimensions or quantities. Shop drawings reviewed more than twice are subject to back charges being levied against the Contractor.

1.05 INFORMATIONAL SUBMITTALS

- A. See Section 01 33 00 – Submittal Procedures, for additional information
- B. Certificates:
 - 1. Manufacturer:
 - Evaluation by PEC before contract award. a.

1.06 **CLOSEOUT SUBMITTALS**

Α. Format:

Submit closeout submittals in .pdf format to the Owner and Consultant for review 1. and approval as soon as they are complete, but no later than 60 days before the date of substantial completion.

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- Include the following: a.
 - Warranty documentation:
 - Manufacturer warranties
 - 2) Record documentation:
 - As-builts
 - 3) Installation matrix:
 - See Division 28 sections for additional information. a)

B. Warranty Documentation:

1. Submit authorized manufacturer warranty documentation as specified in other sections.

C. Record Documentation:

- 1. As-builts:
 - Include device locations, elevations, and riser diagrams. Remove references to project changes.
 - Submit 1 soft copy set of As-builts to the Owner after the review and approval b. process is complete. Create As-builts on 24-inch by 36-inch (Architectural size D) sheets.
 - Create As-builts from project CAD files. As-builts created from .pdf C. documents or other means will not be accepted.
 - d. Submit As-builts in .pdf and .cad format.

2. **Record Drawings:**

- Maintain a complete set of drawings and specifications at the jobsite to clearly and permanently mark changes made.
- Create record drawings from project CAD files. Record drawings created b. from .pdf documents or other means will not be accepted.
- Submit redlined record drawings in .pdf and cad format. C.
- Submit redlined specification changes in .pdf format. d.

1.07 **QUALITY ASSURANCE**

Qualifications: Α.

- 1. Installers:
 - The project requires experienced installers providing similar installations in a. size and complexity.
- 2. Certifications:

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- Division 28 Contractor: a.
 - Access Control manufacturer certification
- 3. **Project Management:**
 - Assign a Project Manager to the project. Project Manager responsibilities
 - 1) Completing and submitting the required documentation.
 - 2) Documenting and completing the punch list.
 - Ensuring completion of the scope of work on time. 3)
 - Ensuring compliance with the contract documents. 4)
 - Overseeing and directing the work and performance of employees and 5) subcontractors.
 - Regularly inspecting work. 6)
 - Reporting unexpected conditions that may result in delay or expense. 7)
 - 8) Scheduling cutovers or tie-ins.

B. Construction Observation:

1. The failure of the Consultant or another representative of the Architect or Owner to condemn any defective work or material shall not release the Contractor from the obligation to at once tear out, remove, repair, or replace upon discovery of nonconforming work or material at any time during the project.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements:
 - 1. Coordinate with the General Contractor for any equipment, products, and materials to be delivered on-site.
- B. Storage and Handling Requirements:
 - Coordinate with the General Contractor for any equipment, products, and materials 1. to be stored on-site.
 - 2. Store and protect products and materials following manufacturer recommendations.
 - 3. Provide secure storage for equipment, products, and materials stored on-site.
 - Follow manufacturer guidelines on proper storage for material.

1.09 WARRANTY

- Manufacturer warranty: Α.
 - 1. Access Control:
 - The Access Control system shall have a warranty period of not less than 1 a. vear.

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PART 2 - PRODUCTS

2.01 COMPONENTS

A. Manufacturers:

- 1. See Division 28 specification sections for product and material requirements.
- 2. Products shall be new, unused, and in the original packaging.
- 3. Products and materials used to accomplish project goals shall meet listed standards and be manufactured to ISO 9001 standards.
- 4. Products specified are intended to establish a baseline for operational, functional, and performance-based standards that proposed products shall meet or exceed by functionality and quality.
- 5. Products listed within Division 28 specifications shall be provided and installed as part of a complete and functioning system unless determined otherwise by the Owner, Architect, or Consultant during the submittal process.
- 6. Provide incidental items required for a complete installation regardless of whether they are specified.

B. Substitution Limitations:

- 1. Specified products and materials establish the overall performance level and provide the physical appearance, part quality, construction quality, and background of proven reliability desired by the Owner and therefore define the minimum standards of quality required for the project. Certain products are not permitted to be substituted and are listed as "Substitutions: Not permitted." Provide substitution requests for products permitted to be substituted. Substitution requests must contain sufficient information verifying equivalency to specified items or can be procured at a lower price to be considered for an approved substitution and shall be submitted before the bid date. Substitution requests submitted after the bid has been awarded will not be accepted without justification. See Section 01 25 00 Substitution Procedures, for pre-bid substitution forms and requirements.
- 2. Installed products or materials that deviate from specified or submitted make, model, color, or other significant characteristics will be removed and replaced with specified or submitted products at no additional cost and with no impact to the construction schedule.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:

1. Perform a site survey before beginning work. Site surveys shall include pathways, raceways, space allocations, installation tolerances, installation hazards, and impediments affecting the installation.

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- 2. Notify the General Contractor of conflicts, discrepancies, or omissions promptly upon discovery. Failure to adequately complete a site survey will not provide a basis for additional compensation.
- 3. Commencement of work without providing notification to the General Contractor indicates acceptance of conditions.
- 4. Errors and omissions in the drawings or specifications do not relieve the Contractor from performing omitted details of the work.
- 5. Verify quantities for equipment, cabling, components, and material before submitting the bid.

3.02 INSTALLATION

A. Systems Integration:

- Field measure indicated mounting heights, as shown on the contract drawings. If mounting heights or other location criteria are not indicated, arrange, and install components and equipment to provide maximum headroom and working clearance.
- 2. Furnish labor, materials, tools, equipment, and services for the installation in accordance with general provisions of contract documents.
- 3. Provide supplementary or miscellaneous items, appurtenances, and incidental devices necessary for a complete installation, whether specifically indicated in the contract documents.
- 4. Install products, materials, and equipment to facilitate service, repair, or replacement.
- 5. Execute work following NEC, OSHA, Fire Code, and ASIS standards, manufacturer written instructions or recommendations, and applicable codes. Where modifications are required due to code, regulations, or authorities, such changes shall be made without additional cost.
- 6. Follow industry standards of good practice for installations.
- 7. Products and materials shall be installed plumb, level, square, permanently attached, and held firmly in place.
- 8. Verify conduit, back boxes, junction boxes, pathways, raceways, and electrical requirements meet size and project requirements.

3.03 FIELD QUALITY CONTROL

A. Field Tests and Inspections:

1. Tests:

- a. Test each system for complete and full functionality.
- b. The Owner, Architect, or Consultant may elect to verify data as part of the acceptance procedures. Provide personnel and equipment at no additional cost.

2. Inspections:

a. Inspections for appropriate installation practices are the responsibility of the Project Manager.

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- At the discretion of the Owner, Architect or Consultant, provide personnel for b. periodic inspections, including a final inspection, at mutually agreed-upon times.
- Scheduled inspections in which the work is deemed incomplete, unfinished, C. or otherwise not ready for inspection are subject to back charges being levied against the Contractor.

Non-Conforming Work: B.

- 1. Work found to be incomplete, unsatisfactory quality, failing to meet specifications, or unacceptable to the Owner, Architect, or Consultant will be documented as a non-conforming work notice, field observation, or punch list and provided to rectify at no additional cost. Provide written notification with pictures upon completion. Incomplete lists will be rejected.
- 2. The non-conforming work notice, field observation, or punch list will be considered complete only after being signed off by the Owner, Architect, or Consultant.

3.04 **CLEANING**

A. Waste Management:

- Remove trash and refuse after each workday. 1.
- 2. Coordinate with the General Contractor for disposal of packaging and waste materials created during work to an approved common trash or recycling point or
- 3. Keep work area neat, tidy, and free from accumulating waste materials.
- Remove foreign material, dust, dirt, paint, unneeded labels, and stickers from 4. equipment after completion.

CLOSEOUT ACTIVITIES 3.05

Α. Demonstration:

- 1. Demonstrate the features and operation of each system to the appropriate personnel. Provide demonstration time to Owner designated personnel on the use and operation of the system as specified in each section. The instructor shall be fully knowledgeable and qualified in system operation.
- 2. Schedule sessions with the General Contractor. The demonstration must be provided in accordance with a schedule acceptable to the Owner. Sessions may be recorded by the General Contractor and provided to the Owner.

B. Training:

1. Train appropriate personnel on the operation and maintenance of each system. Provide demonstration time to Owner designated personnel on the use and operation of the system as specified in each section. The instructor shall be fully knowledgeable and qualified in system operation.

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2. Schedule sessions with the General Contractor. The demonstration must be provided in accordance with a schedule acceptable to the Owner. Sessions may be recorded by the General Contractor and provided to the Owner.

END OF SECTION 28 05 00

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SECTION 28 05 53

IDENTIFICATION FOR ELECTRONIC SAFETY AND SECURITY

PART 1	- (GEN	NERAL
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- 1.01 SUMMARY
 - A. Section Includes:
 - 1. Labeling requirements
 - B. Related Requirements:
 - 1. Section 27 15 01.15 Access Control Communications Conductors and Cables
 - 2. Section 28 10 00 Access Control
- 1.02 REFERENCES
 - A. Reference Standards:
 - 1. ANSI/TIA-606-C, Administration Standard for Telecommunications Infrastructure
- 1.03 ADMINISTRATIVE REQUIREMENTS
 - A. Coordination:
 - 1. Coordinate labeling requirements with the Owner.
- 1.04 ACTION SUBMITTALS (NOT USED)
- 1.05 INFORMATIONAL SUBMITTALS (NOT USED)
- 1.06 CLOSEOUT SUBMITTALS (NOT USED)
- 1.07 QUALITY ASSURANCE (NOT USED)

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PART 2 - PRODUCTS

2.01 COMPONENTS

- A. Manufacturers:
 - 1. Labeling machines:
 - a. Brady
 - b. Brother
 - c. Dymo
 - d. Panduit
 - 2. Label type:
 - a. Characters on labels shall be black printed on a white background.
 - b. Label size shall be appropriate to cable size, outlet layout, or other related equipment sizes and layouts.

PART 3 - EXECUTION

- 3.01 EXAMINATION (NOT USED)
- 3.02 INSTALLATION
 - A. Systems Integration:
 - 1. General labeling:
 - a. Clean surfaces thoroughly before attaching labels.
 - b. Install machine-generated labels firmly, neatly, and level.
 - c. Handwritten labels are not acceptable.
 - d. Complete labeling no later than 30 days before substantial completion.
- 3.03 FIELD QUALITY CONTROL
 - A. Field Tests and Inspections:
 - 1. Tests: Not used
 - 2. Inspections:
 - a. Inspection for correct labeling scheme is the responsibility of the Project Manager.

END OF SECTION 28 05 53

Salas O'Brien

IDENTIFICATION FOR SAFETY AND SECURITY 28 05 53 - 2

2 DOOR ENHANCED DOOR CONTROL DEVICE Attachment A-1 Work and Product Specifications for RFP 670



APPLICATION

- ☐ The EDCD-2 (Door Control Device) is designed to control 2 access points. It offers a larger card holder database and significantly faster processing and communications speed than the standard DCD. This device can accept inputs from most reader technologies, analog alarm devices, and analog inputs from request to exit devices.
- Stores data for up to 60,000 cards. in the event of a computer or communications failure it will provide uninterrupted access control and log up to 2000 transactions into its onboard memory.

FEATURES

- Supports Wiegand Card Reader protocols, configurable from 0-50 bits; Magstripe formats ABA/ISO Track 2 with configurable data bits; Clock and Data, and Marlok protocol.
- Communicates using various types of supervised wiring methods including; Daisy-Chaining, T-Tapping, Home Running, Star Configuration, and High Security Loop Back.
- EDCD's communicate to the Millennium Software through Site Control Units (SCU or ESCU). Each SCU/ESCU can support up to 99 EDCD's.
- □ Up to 100,000 DCD's can be connected over 1000 SCU's (Site Control Units).



EDCD-2



149-202002

EDCD-2 Two door/two reader controller. 7 alarm inputs, 2 reaer ports.



Enclosure



060-101025

Millennium Back Box package enclosure - with screw mounted cover.



Enclosure



041-100992

1 Board Surface Enclosure - Enclosure suitable for 1 Millennium circuit board, with camlock.

SPECIFICATIONS

Power Requirements

• 9-14 VDC, from our standard Power Supply. Current consumption is 200mA nominal, and 500 mA maximum.

Circuit Protection

 Input power is protected from reverse polarity, over voltage, and transient surges.

EDCD Device Communications

• A twisted pair, multi-drop, RS-485 polling scheme is used to communicate from the DCD to the other Millennium Devices.

Programmable Relays

 Each EDCD-2 employs4 programmable Single pole, Form C relays that are rated for 2 amps @ 24 VDC.

All Events History Buffer

• 2000 all events history, stored in RAM memory with a minimum of 24 hours backup.

Alarm Monitoring

- The DCD has the capability to monitor up to 7 independent alarm inputs. 4 are supervised with 1K EOL resistors, and the other 3 are normally closed circuits. The circuit must have a break time of at least 500 ms for the alarm to trigger. Priority Event **Buffer**
- 100 software selectable priority events (alarms, com fail, etc.). These events are stored on-board if the SCU is off-line with the host computer. They can be programmed to send signals back to the computer if they are activated.

Page 22 of 41

Operating Temperature

• 14° to 104°F (-10° to 40°C) less than 90% non-condensing humidity.

Cover Tamper

- On-board integrated tamper switch. Approvals and Listing
- UL 294 pending

Dimensions

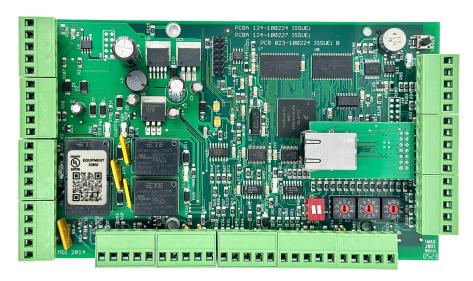
• 4.24" x 7.35" @ < 1lb, 10.4 x 18.7cm @ < 0.4 Kg

Approvals and Listing

UL 294



Attachment AM Workand Producespieco i Cations For RFP 670

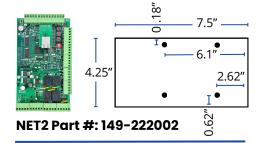


APPLICATION

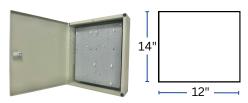
☐ The NET2 allows for singleboard reader capability without requiring additional boards for server software communication. It controls two access points and accepts connections to most reader technologies. The NET2 stores data for up to 40,000 cards. Cardholder access levels are stored directly on the board, and a log of up to 2,000 transactions are available in memory, even in the event of computer or communications failure.

FEATURES

- ☐ Supports Wiegand Card Reader protocols, configurable from 0-256, Magstripe formats of ABA/ISO Track 2 with configurable data bits; Clock and Data.
- ☐ Incorporates the functions of an SCU, ESCU and EDCD and can be connected to EDCD/DCD boards via RS-485 using various types of supervised wiring methods; Home Running, High Security Loop Back, Daisy- Chaining, and T-Tapping.
- Communicates to the Millennium Software via Ethernet (TCP/IP connection) and can support up to 98EDCD/DCD doors.



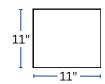
NET Double Reader Ethernet/IP door controller includes plug-in power supply.



Enclosure Part #: 062-510235

Board Surface Enclosure suitable for 3 Millennium circuit boards with camlock.





Enclosure Part #: 041-100992

Surface Enclosure suitable for 1 Millennium circuit board, with camlock.

SPECIFICATIONS

Card Data Storage

 Each NET2 stores data for up to 40,000 cards using less than 60 bits

Transaction History Buffer

 2,000 transaction history provides retention of card activity if communications with server software is lost.

NET2 Communications

 Twisted pair, multi-drop, RS-485 polling scheme used to communicate with other Millennium Devices.

Alarm Monitoring

• Monitor up to 7 independent alarm inputs, two or four state supervised.

Programmable Relays

 Each NET2 includes 4 programmable Single pole, Form C relays that are rated for up to 5 amps @24 VDC or 10 amps @ 24VAC. These are typically used for door locking device.

Circuit Protection

- Input power is protected from reverse polarity, over voltage, and transient surges.
- Relays are overload protected by solid state devices.

Alarm Event History Buffer

 100 software selectable alarm events (alarms, com fail, etc.) are stored if communications with the server software is lost

Operating Temperature

• 14° to 104°F (-10° to 40°C) less than 90% non-condensing humidity

Power Requirements

 9-14 VDC, supplied by MGI's PS1 power supply; Current consumption is 150mA nominal.

Cover Tamper Switch

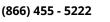
On-board integrated tamper switch

Dimensions

- 4.24" x 7.35" @ < 1lb
- 10.8 x 18.7cm @ < 0.45Kg

Certification and Listing

UL 294 Listed









SMP3PMP4
Multi-Output Power Supply/Charger

Rev. DSSMP3PMP4_03312016



Overview

SMP3PMP4 is a multi-output power supply/charger that converts a 115VAC/230VAC, 50/60Hz input into four (4) 12VDC or 24VDC outputs.

Input:

• Input 115VAC, 50/60Hz, 0.65 amp or 230VAC, 50/60Hz, 0.35 amp.

Output:

- 12VDC or 24VDC selectable output.
- 2.5 amp supply current.
- Four (4) fuse protected outputs.
- Outputs are rated @ 3.5 amp.
- Filtered and electronically regulated outputs.
- Short circuit and thermal overload protection.

Battery Backup:

- Built-in charger for sealed lead acid or gel type batteries.
- Maximum charge current 0.5 amp.
- Zero voltage drop when switching over to battery backup.

Supervision:

- AC fail supervision (form "C" contacts).
- Low battery supervision (form "C" contacts).

Specifications

Visual Indicators:

• AC input and DC output LED indicators.

Electrical:

- Operating temperature: 0° C to 49° C ambient.
- BTU/Hr.:
 - 12VDC: 15.35 BTU/Hr.
 - 24VDC: 30.71 BTU/Hr.
- System AC input VA requirement:
 - 115VAC: 74.75VA.
 - 230VAC: 80.5VA.

Mechanical:

- Enclosure Dimensions (H x W x D approx.): 13.5" x 13" x 3.25" (343mm x 330mm x 83mm)
 - Accommodates up to two (2) 12VDC/7AH batteries.
- Product weight (approx.): 8.4 lbs. (3.81 kg).
- Shipping weight (approx.): 9.4 lbs. (4.26 kg).

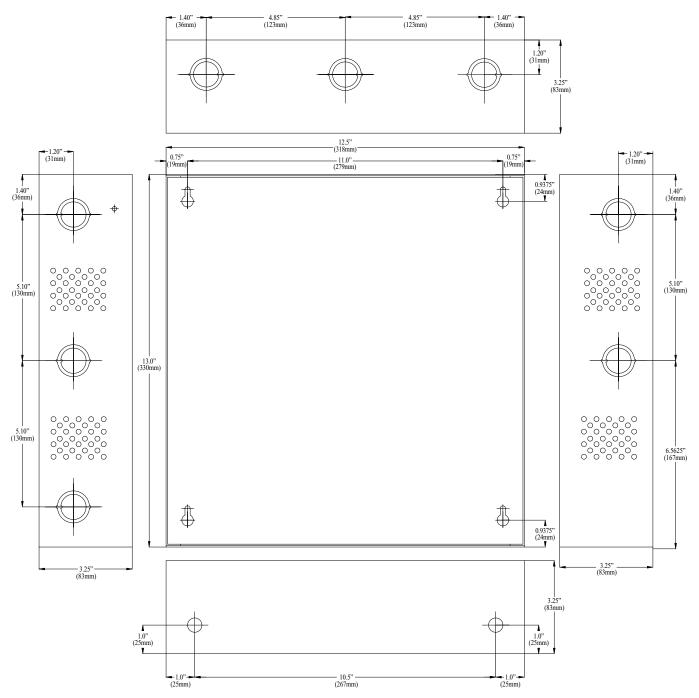
Agency Approvals



European Conformity

Enclosure Dimensions (H x W x D approximate):

13.5" x 13" x 3.25" (343mm x 330mm x 83mm)



SMP3PMP8

Power Supply Charger, 8 Fused Outputs, 12/24VDC @ 2.5A, 115/220VAC, Supervision, BC300 Enclosure

SMP3PMP8 is a multi-output power supply/charger that converts a 115VAC/230VAC, 50/60Hz input into eight (8) 12VDC or 24VDC outputs.



Specifications

Input

 Input 115VAC, 50/60Hz, 0.65A or 230VAC, 50/60Hz, 0.35A.

Output

- 12VDC or 24VDC selectable output.
- 2.5A supply current.
- Eight (8) fuse protected outputs.
- Outputs are rated @ 3.5A.
- Filtered and electronically regulated outputs.
- Short circuit and thermal overload protection.

Battery Charging

- Built-in charger for sealed lead acid or gel type batteries.
- Zero voltage drop when switching over to battery backup.
- (Batteries are sold separately).

Supervision

- AC fail supervision (form "C" contacts).
- Low battery supervision (form "C" contacts).

Features

Agency Listings

CE Compliant

Dimensions & Weight

Enclosure:

Wall mount enclosure for indoor use.

Accommodates up to two (2) 12VDC/7AH

Batteries.

Dimensions **13"W** x **13.5"H** x **3.25"D** (330 mm W x 343 mm H x 83 mm D).

1/2" and 3/4" combination knockouts.

Weights (approximate):

Product Weigtht: 8.5 Lbs. (3.86 kg).

Shipping Weigtht: 9.5 Lbs. (9.5 kg).

Attachment A-1 Work and Product Specifications for RFP 670 o Power ON/OFF switch.

Visual Indicators

• AC input and DC output LED indicators.

Temperature

- $\circ~$ Operating: 0° C to 49° C (32° F to 120° F).
- Storage: 20° C to 70°C (4° F to 158° F).
- Relative Humidity: 85% +/- 5%.

BTU/Hr. (approx.):

- 12VDC: 15 BTU/Hr.
- 24VDC: 31 BTU/Hr.



SMP3PMP16 Multi-Output Power Supply/Charger

Rev. DSSMP3PMP16_03312016



Overview

SMP3PMP16 is a multi-output power supply/charger that converts a 115VAC/230VAC, 50/60Hz input into sixteen (16) 12VDC or 24VDC outputs.

Input:

• Input 115VAC, 50/60Hz, 0.65 amp or 230VAC, 50/60Hz, 0.35 amp.

Output:

- 12VDC or 24VDC selectable output.
- 2.5 amp supply current.
- Sixteen (16) fuse protected outputs.
- Outputs are rated @ 3.5 amp.
- Filtered and electronically regulated outputs.
- Short circuit and thermal overload protection.

Battery Backup:

- Built-in charger for sealed lead acid or gel type batteries.
- Maximum charge current 0.5 amp.
- Zero voltage drop when switching over to battery backup.

Supervision:

- AC fail supervision (form "C" contacts).
- Low battery supervision (form "C" contacts).

Specifications

Visual Indicators:

AC input and DC output LED indicators.

Electrical:

- Operating temperature: 0° C to 49° C ambient.
- BTU/Hr.:
 - 12VDC: 15.35 BTU/Hr.
 - 24VDC: 30.71 BTU/Hr.
- System AC input VA requirement:
 - 115VAC: 74.75VA.
 - 230VAC: 80.5VA.

Mechanical:

- Enclosure Dimensions (H x W x D approx.): 13.5" x 13" x 3.25" (343mm x 330mm x 83mm)
 - Accommodates up to two (2) 12VDC/7AH batteries.
- Product weight (approx.): 8.7 lbs. (3.95 kg).
- Shipping weight (approx.): 9.7 lbs. (4.40 kg).

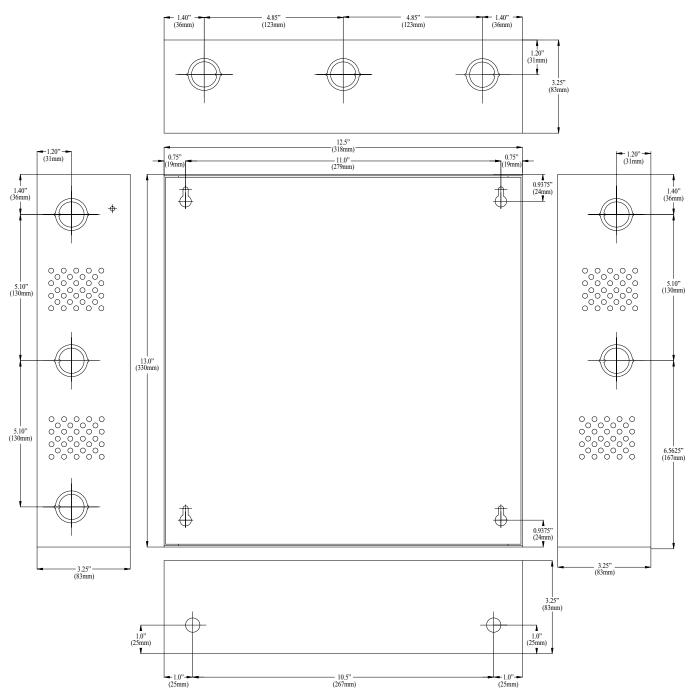
Agency Approvals



European Conformity

Enclosure Dimensions (H x W x D approximate):

13.5" x 13" x 3.25" (343mm x 330mm x 83mm)



Panic Switch



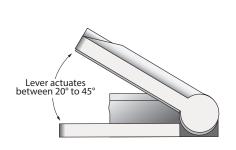
WWW.GRISK.COM



GR3045 Series

UL pending

- ♦ Easy installation
- ♦ Mounts underneath or on the side of desk or counter
- Mounts horizontal or vertical
- ♦ Smooth housing prevents accidental clothing damage
 - ♦ Actuating lever designed for finger tip
- ♦ Reed contacts reset when lever is in closed position
 - ♦ Closed Loop outputs
 - ♦ Cold temp versions for refrigerators and freezers
- ♦ Screw terminals and 12 ft. jacketed leads available
 - ♦ Available in white







EMERGENCY

Part Numbers

<u>Terminals</u>

Operating Temperature

GR3045

2 screw terminals

0°F to 140°F (-18°C to 60°C)

GR3045CT 12 ft jacketed leads

-40°F to 140°F (-40°C to 60°C)

WARRANTY: One year warranty against workmanship, material and factory defects.

GEORGE RISK INDUSTRIES, INC. G.R.I. PLAZA KIMBALL, NE 69145



1-800-445-5218 1-800-523-1227 (308) 235-4645 FAX (308) 235-3561 E-MAIL: sales@grisk.com

Panic Switch



WWW.GRISK.COM

Suggested mounting options.









INSTALLATION:

MOUNTING INSTRUCTIONS

- 1. Determine the best mounting position so that the panic switch can be easily found and reached in an emergency, but that will not attract attention when the user activates the switch. Typical locations are on the underside of a counter top, on the side of a knee hole of a desk, in a hallway or bedroom, or near an entryway. The unit can be mounted horizontally or vertically and should be mounted low enough so that a person could reach it from the floor. Three inches of clearance above the mounting surface is required so that the lever can be fully opened.
 - 2. Temporarily place the switch were it will be mounted and mark the screw locations.
 - 3. Drill pilot holes or start the screws to make installing screws easier.
 - 4. **GR3045:** Connect the wires to the terminals per the wiring instructions before mounting switch.
 - 5. After wiring is complete, install screws through the switch housing and firmly secure in place.
- 6. **GR3045CT:** After securing switch in place, run wire cable as needed and connect wires per the wiring instructions.
 - 7. Test unit by pulling the lever and then closing it again.

WIRING INSTRUCTIONS

The GR3045 and GR3045CT is connected to the alarm panel across a zone's high and low input. There is no polarity to this switch and can be connected in series with other switches.

The switch circuit is not latching and will re-activate when the lever is closed.

GRI PRODUCTS MEET OR EXCEED THESE MINIMUM GENERAL SPECIFICATIONS:

		Electrical	Initial Contact	Max. Contact	Max. Switching	Max. Switching
Part Number	Loop Type	Configuration	Resistance (Ω)	Rating	Voltage (V)	Current
GR3045	Closed	N/C	.150	10	200	.500
GR3045CT	Closed	N/C	.150	10	200	.500

WARRANTY: One year warranty against workmanship, material and factory defects.

GEORGE RISK INDUSTRIES, INC. G.R.I. PLAZA KIMBALL, NE 69145



1-800-445-5218 1-800-523-1227 (308) 235-4645 FAX (308) 235-3561 E-MAIL: sales@grisk.com

ASSA ABLOY

8000 Series No-Cut Electric Strikes

Retrofit solutions to electrify cylindrical and mortise locksets

Experience a safer and more open world



The 8000 Series offers compact, high performance electric strikes featuring a unique concealed design for cylindrical or mortise locksets.

No cutting on the frame is required, which means less time spent installing the strike. Simply remove the existing strike plate, adjust the vertical alignment to the latchbolt centerline, and install.

Ideal for aluminum, wood and hollow metal applications in office spaces, interior entries, stairwells, and other openings requiring electronic access control.



8000

Works with Cylindrical Locksets up to a 5/8" Throw Latchbolt



Concealed Design



Works with Cylindrical Locksets up to a 5/8" Throw Latchbolt

+







8500

Works with Mortise Locksets without a Deadbolt up to 3/4" Throw Latchbolt

Full pocket shims for horizontal







Saves Time

No cutting in to the face of the frame Accommodates door sag with

Page 33 of 41



Specifications for all 8000 Family Strikes

Certifications

- ANSI/BHMA, A156.31 Grade 1
- UL 1034 burglary-resistant listed and suitable for outdoor use
- UL 294 listed
- **RoHS Compliant**

Electrical (DC Continuous Duty)

- Dual voltage 12/24 VDC
- 240 mA at 12VDC 120 mA at 24 VDC

Features

- No cutting required
- Vertical adjustability to accommodate door sag and misalignment
- Tamper resistant
- Non-handed
- Internally mounted solenoid
- SecuriCare five-year, no-fault, no questions asked warranty
- Addition of SMART Pac® III extends warranty to 10 years







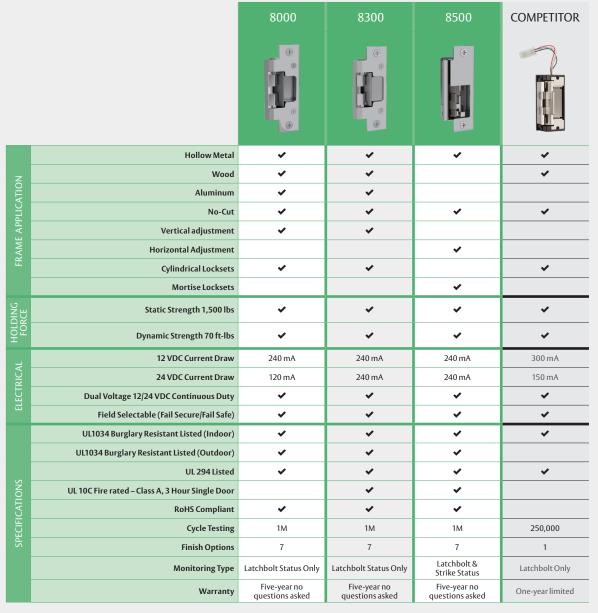












How to Order

Series	Model	Finish*	Option (s)
8000	_	- 630	– LBM
8000	C* Complete Electric	605 Bright Brass	LBM Latchbolt
8300	Strike; Includes the 801 and 801A faceplates	606 Satin Brass	Monitor
	and oon traceplaces	612 Satin Bronze	
		613 Bronze Toned	
		629 Bright Stainless Steel	
		630 Satin Stainless Steel	
		BLK Black	
8500		605 Bright Brass	LBM Latchbolt
		606 Satin Brass	Monitor
		612 Satin Bronze	LBSM Latchbolt
		613 Bronze Toned	& Strike Monitor
		629 Bright Stainless Steel	Willing
		630 Satin Stainless Steel	

^{*}Complete Pacs are only available in the 630 finish





The ASSA ABLOY Group is the global leader in access solutions. Every day we help people feel safe, secure and experience a more open world.

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CANADA

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sales.dss.ca@assaabloy.com | orders.dss.ca@assaabloy.com

Printed in the U.S.A.

Patent pending and/or patent www.assaabloydss.com/patents

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LARGE ENCLOSURE FOR UP TO 24 DOORS







boards and wiring not included**

FEATURES

- Optimizes space promoting a neat and organized installation environment.
- Minimizes clutter and simplifies installation.
- Reduces the need for multiple individual enclosures and associated infrastructure.
- Lower installation expenses, as fewer enclosures mean less cabling, wiring, and labor required.

COMPATIBLE BOARDS



149-101966 / 149-202002

EDCD and EDCD2



149-102002 / 149-222002

NET1 and NET2



149-101992

ESCU

APPLICATION

- Fits up to 12 MGI boards, or 24 doors.
- Compatible to be used with our EDCD, EDCD2, NET1, NET2 and ESCU Boards.
- Pre-installed panels ensure a fast and efficient installation process.
- · Save on labor costs with the pre-made setup.
- Enjoy many expansion possibilities, ensuring your access control system can grow as your needs evolve.
- Enjoy the convenience of centralized control and management for all your access points.
- Reduce installation errors with the easy-to-use setup
- Designed to optimize space utilization at your job site.
- · Comes with or without power supply.

SPECIFICATIONS

Part Number

- 062-510300 with Power Supply
- 062-520300 no Power Supply

Package Contents

 Mounting Enclosure, Removable Door, Millennium Key/Lock, Studs, Back Panels

Holes

 In place for bolting the door shut, and a door knockout fits MGI's line of key locks.

Compatibility

MGI Standard Key Lock

Mounting Panel

 4 Removable Mounting Panels that are compatible to fit any 12 Millennium control door boards.

Features

 Cam Lock, Durable, Removable Back Panel, Removable Door, Vent

Knockouts

 Multiple conveniently located electrical knockouts all around the enclosure

Color

• Light Gray

Finishing

Durable powder-coat finish

Rugged

 CRS construction with a Tab-N-Slot removable door

Dimensions

• 6 x 30 x 24 inches



Detailed Specifi ation & Technical Data





25224B

2 Conductor 18AWG Unshielded CMP Rated Audio, Control, and Low Voltage Power

Construction & Dimenstions

CONDUCTOR PARAMETERS	-
Number Of Conductors	2
AWG Size	18
Conductor Stranding	7x26
Conductor Type	Bare copper
Nominal DCR	6.2 Ohm/1000ft
Cabling Lay Length	3.5 in
Twists / Foot	3.4 twist/ft
INSULATION PARAMETERS	
Insulation Type	Plenum PVC
Insulation Thi kness	0.008 in
Insulation Color Code	1. Black 2.Red
SHIELDING PARAMETERS	
Shield Type	None
ELECTRICAL CHARACTERISTICS	

Overall Construction

OVERALL CONSTRUCTION PARAMETERS	
Jacket Type	Flexible Plenum
Jacket Thi kness	0.015 in
Nominal Cable O.D.	0.154 in
Plenum	Yes
NEC UL Rating	CMP
RoHS Compliant	Yes
Pull Tension	42 lbs
Bend Radius	1.386 in
Cable Weight	17 lbs

Overall Electrical & Optical Characteristics

OVERALL ELECTRICAL/OPTICAL CHARACTERISTICS	-
UL Flammability	NFPA 262 Plenum
Operating Range	-0 to 60 Deg C
UL Voltage Rating	300

Detailed Specifi ation & Technical Data



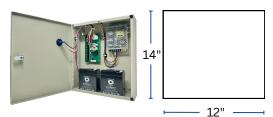


25224B

Related Products

RELATED PRODUCTS	-
Non Plenum Number	224
Aquaseal Number	AQC224
Aquaseal Direct Burial Number	AQ224
SpeakOn Panel Mount	CN-NL4MP





PS1: 100213-001

Power supply and 8AH batteries, 120V / 60Hz, 12VDC 5A with line conditioner.

APPLICATION

- ☐ The PS1 power supply is a robust filters DC power source for the Millennium controller boards. Each power supply can power up to 15 E-series single door controllers or 8, 2 door controllers, as well as condition the data line to keep the RS-485 communications signal sharp and full over up to 4,000 feet!
- The secondary board generates the necessary biasing voltages for the RS-485 communications, which link the controller boards to a Site Control Unit.

FEATURES

☐ Includes batteries, enclosure, and MGI key lock. An LCD indicator has been added to the front of the enclosure's door for easy verification of power output and current consumption.

SPECIFICATIONS

Output Power

Delivers a regulated and filtered
 13.8 VDC output at 5 Amps

Fuse Protection

- The AC input is protected by a 2 Amp low blow fuse
- A 5 Amp slow blow fuse is used to protect the batteries

Protection

- The DC output is current limited against possible short circuits
- AC failure monitoring
- Form A output for monitoring the status of the AC input

Battery Backup

 Uses two 6 Volt, 8 Amp lead acid type batteries

Operating Temperature

 14°to 104°F (-10°to 40°C) less than 90% non-condensing humidity

Power Requirements

 120 VAC or 220 VAC input on a 5 Amp unswitched dedicated circuit

Cover Tamper Switch

 Form A output monitor the status of the enclosure door

Dimensions

- 14.25" X 12.25" X 4.25" @ 27lbs
- 36.2 X 31.1 X 10.8 cm @ 12.2kg

Certification / Listing

UL 294, CA 1950

Page 39 of 41







AV, SECURITY & NETWORKING SOLUTIONS

253270B

22/6 Shielded CMP Audio and Control

Construction & Dimensions

CONSTRUCTION & DIMENSIONS	-
CONDUCTOR PARAMETER	-
Number of Conductors	6
• AWG Size	22
Conductor Stranding	7x30
Conductor Type	Bare copper
Nominal DCR	17 Ohm/1000ft
INSULATION PARAMETER	-
• Insulation Type	Plenum PVC
• Insulation Thi kness	0.007 in
• Insulation Color Code	1.Black,2.Red,3.White,4.Green,5. Brown,6.Blue
SHIELDING PARAMETER	-
• Shield Type	Overall 100% Aluminum Foil
Drain Wire Type	Tinned Copper
• Drain Wire AWG	24 AWG
ELECTRICAL CHARACTERISTICS	-
Nom. Cap. Between Conductors	54 pF/ft
Nom. Cap. Conductor to Shield	97 pF/ft

Overall Construction

OVERALL CONSTRUCTION PARAMETERS	-
Jacket Type	Flexible Plenum
Jacket Thi kness	0.015 in
Nominal Cable O.D.	0.162 in
Plenum	Yes
NEC UL Rating	CMP
RoHS Compliant	Yes
Bend Radius	1.458 in
Cable Weight	25 lbs

Overall Electrical & Optical Characteristics

OVERALL ELECTRICAL/OPTICAL CHARACTERISTICS	-
UL Flammability	NFPA 262 Plenum
Operating Range	-0 to 60 Deg C
UL Voltage Rating	300

Attachment A-1 Work and Product Specifications for RFP 670 Detailed Specification & Technical Data WEST PENN



253270B

22/6 Shielded CMP Audio and Control

Related Products

RELATED PRODUCTS	-
Non Plenum Number	3270