SECTION 087100
DOOR HARDWARE

1. GENERAL
	* + 1. GENERAL PROVISIONS
				1. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.
			2. DESCRIPTION OF WORK
				1. Work Included: Provide materials and equipment necessary to complete the work of this Section, including but not limited to the following:

Mortise locksets.

Architectural trim.

Sliding and pocket door hardware.

* + - * 1. Related Work: The following items are not included in this Section and are specified under the designated Sections:

Division 26 - Electrical for power for electrified door hardware and interface with building control and security systems.

* + - 1. REFERENCE STANDARDS
				1. Comply with the following reference standards and publications as applicable to the project..
				2. American National Standards Institute (ANSI):

ANSI A117.1 Accessible and Usable Buildings and Facilities.

* + - * 1. Builders Hardware Manufacturers Association (BHMA):

ANSI/BHMA A156.18 Materials & Finishes.

ANSI/BHMA A156.25 Electrified Locking Devices.

* + - * 1. Underwriters Laboratories Inc. (UL):

UL 294 Burglary-Resistant Electric Locking Mechanisms

UL 1034 Burglary-Resistant Electric Locking Mechanisms.

* + - 1. SUBMITTALS
				1. Product Data: Include installation details, material descriptions, dimensions of individual components and profiles, and finishes.
				2. Shop Drawings: Details of electrified door hardware, indicating the following:

Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring. Include the following:

System schematic.

Point-to-point wiring diagram.

Riser diagram.

Elevation of each door.

Detail interface between electrified door hardware and fire alarm access control and building control and security systems.

* + - * 1. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."

Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.

Organize door hardware sets in same order as in the Door Hardware Schedule at the end of Part 3.

Content: Include the following information:

Type, style, function, size, label, hand, and finish of each door hardware item.

Manufacturer of each item.

Fastenings and other pertinent information.

Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.

Explanation of abbreviations, symbols, and codes contained in schedule.

Mounting locations for door hardware.

Door and frame sizes and materials.

Description of each electrified door hardware function, including location, sequence of operation, and interface with other building control systems.

Sequence of Operation: Include description of component functions that occur in the following situations: authorized person wants to enter; authorized person wants to exit; unauthorized person wants to enter; unauthorized person wants to exit.

Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

* + - * 1. Keying Schedule: Prepared by or under the supervision of supplier, detailing the Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.
				2. Product Certificates: Signed by manufacturers of electrified door hardware certifying that products furnished comply with requirements.

Certify that door hardware approved for use on types and sizes of labeled fire doors complies with listed fire door assemblies.

* + - * 1. Qualification Data: For firms and persons specified in "Quality Assurance" Article.

Include lists of completed projects with project names and addresses of architects and owners, and other information specified.

* + - * 1. Maintenance Data: For each type of door hardware to include in maintenance manuals specified in Division 01.
				2. Warranties: Special warranties specified in this Section.
			1. QUALITY ASSURANCE
				1. Installer Qualifications: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
				2. Supplier Qualifications: Door hardware supplier with warehousing facilities in Project's vicinity and who is or employs a qualified Architectural Hardware Consultant, available during the course of the Work to consult with Contractor, Designer, and the Owner about door hardware and keying.

Electrified Door Hardware Supplier Qualifications: An experienced door hardware supplier who has completed projects with electrified door hardware similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance, and who is acceptable to manufacturer of primary materials.

Engineering Responsibility: Prepare data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

Scheduling Responsibility: Preparation of door hardware and keying schedules.

* + - * 1. Architectural Hardware Consultant Qualifications: A person who is currently certified by the Door and Hardware Institute as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.

Electrified Door Hardware Qualifications: Experienced in providing consulting services for electrified door hardware installations.

* + - * 1. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.

Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that are listed to perform electrical modifications, by a testing and inspecting agency acceptable to authorities having jurisdiction, are acceptable.

* + - * 1. Regulatory Requirements: Comply with provisions of the following:

Where indicated to comply with accessibility requirements, comply with Massachusetts Architectural Access Board and the Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," as follows:

Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.

Door Closers: Comply with the following maximum opening-force requirements indicated:

Interior Hinged Doors: 5 lbf applied perpendicular to door.

Sliding or Folding Doors: 5 lbf applied parallel to door at latch.

Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.

NFPA 101: Comply with the following for means of egress doors:

Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.

Delayed-Egress Locks: Lock releases within 15 seconds after applying a force not more than 15 lbf for not more than 3 seconds.

Door Closers: Not more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.

Thresholds: Not more than 1/2 inch high.

Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

* + - * 1. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

Test Pressure: Test at atmospheric pressure.

* + - * 1. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:

Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.

Preliminary key system schematic diagram.

Requirements for key control system.

Address for delivery of keys.

* + - * 1. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01. Review methods and procedures related to electrified door hardware including, but not limited to, the following:

Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.

Review sequence of operation for each type of electrified door hardware.

Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

Review required testing, inspecting, and certifying procedures.

* + - 1. DELIVERY, STORAGE, AND HANDLING
				1. Delivery: Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
				2. Keys: Deliver keys to manufacturer of key control system.
			2. COORDINATION
				1. Coordination: Coordinate layout and installation of recessed pivots and closers with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Section 033000 - CAST-IN-PLACE CONCRETE.
				2. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
				3. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm system and detection devices, access control and building control system.
			3. WARRANTY
				1. General Warranty: Special warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
				2. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:

Structural failures including excessive deflection, cracking, or breakage.

Faulty operation of operators and door hardware.

Deterioration of metals, metal finishes, and other materials beyond normal weathering.

* + - * 1. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.
				2. Warranty Period for Manual Closers: Ten years from date of Substantial Completion.
			1. MAINTENANCE SERVICE
				1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for the Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
1. PRODUCTS
	* + 1. MANUFACTURER
				1. Basis-of-Design Manufacturer: Unison Hardware, Inc., INOX, Tel: 916-388-1888. Fax: 916-388-8322. Internet: [www.inoxproducts.com](https://www.unisonhardware.com/).
				2. Basis of Design: INOX; PD97PT Series Electrified Mortise Sliding Door Lock with Power Transfer:

Function: [Privacy] [Entry/Office] [Classroom] [Patio/Exit].

Options: [PD97] [PD97ES] [REX] [DBM] [ATL] [DPS].

Backset: [2-1/2 inches] [2-3/4 inches].

Rose Style: [XGT Round] [XGS Square].

Lever: [201 Cologne] [202 Munich] [205 Frankfurt] [221 Aurora] [243 Sunrise] [244 Twilight] [318 Café] [345 Tokyo] [346 Osaka].

Finish: [32D Satin stainless steel] [C19G Graphite black] [C19 Flat black] [CGY Stormy gray] [CDB Dark bronze].

* + - 1. KEYING
				1. Keying: [Keyed different] [Keyed alike] [Master keying] [Grand master keying] [Construction keying] [Keyed to specific number].
1. EXECUTION
	* + 1. EXAMINATION
				1. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
				2. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
				3. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. PREPARATION
				1. Steel Doors and Frames: Comply with DHI A115 series.

Surface-Applied Door Hardware: Drill and tap doors and frames according to SDI 107.

* + - * 1. Wood Doors: Comply with DHI A115-W series.
			1. INSTALLATION
				1. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."

Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."

Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

* + - * 1. Installation: Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.

Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

* + - * 1. Key Control System: Place keys on markers and hooks in key control system cabinet, as determined by final keying schedule.
				2. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Designer.

Configuration: Provide the least number of power supplies required to adequately serve doors with electrified door hardware.

* + - * 1. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Section 079200 - JOINT SEALANTS.
			1. ADJUSTING
				1. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.

* + - * 1. Six-Month Adjustment: Approximately six months after date of Substantial Completion, Installer shall perform the following:

Examine and readjust each item of door hardware as necessary to ensure function of doors, door hardware, and electrified door hardware.

Consult with and instruct the Owner's personnel on recommended maintenance procedures.

Replace door hardware items that have deteriorated or failed due to faulty design, materials, or installation of door hardware units.

* + - 1. CLEANING AND PROTECTION
				1. Clean adjacent surfaces soiled by door hardware installation.
				2. Clean operating items as necessary to restore proper function and finish.
				3. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.
			2. HARDWARE SET SCHEDULE
				1. Refer to the Drawings.

END OF SECTION