SECTION 087113 - POWER DOOR OPERATORS

1. GENERAL
   * + 1. SUMMARY
          1. Section Includes:

Power door operators for swinging doors.

Low-energy door operators for swinging doors.

Power-assist door operators for swinging doors.

Refer to sections listed below for cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections. Sections listed below are for spec editor’s and design team coordination and are to remain as Editor’s Notes. Remove referenced specification sections within the body of the specification if not applicable to the project.

Section 033000 "Cast-in-Place Concrete" for installing recessed metal frames for control mats in concrete.

Section 084229.33 "Swinging Automatic Entrances" for swinging doors and frames packaged with power door operators.

* + - 1. DEFINITIONS

Retain terms that remain after this Section has been edited for a project.

* + - * 1. AAADM: American Association of Automatic Door Manufacturers.
        2. Activation Device: A control that, when actuated, sends an electrical signal to the door operator to open the door.
        3. Double-Egress (Doors): A pair of doors that simultaneously swing, with the two doors moving in opposite directions with no mullion between them.
        4. Double-Swing (Doors): A pair of doors that swing, with the two doors moving in opposite directions with a mullion between them; each door functioning as a single-swing door.
        5. Safety Device: A control that, to avoid injury, prevents a door from opening or closing.

Retain first option in paragraph below for power-operated doors; retain second option for power-assist and low-energy doors.

* + - * 1. For automatic door terminology, see [**BHMA A156.10**] [**and**] [**BHMA A156.19**] for definitions of terms.
      1. COORDINATION

Retain applicable requirements in this article to suit Project.

* + - * 1. Coordinate sizes and locations of recesses in concrete floors for recessed control mats that control power door operators. Concrete, reinforcement, and formwork requirements are specified elsewhere.
        2. Templates: Distribute for doors, frames, and other work specified to be factory prepared and reinforced for installing power door operators.
        3. Coordinate hardware for doors with operators to ensure proper size, thickness, hand, function, and finish.
        4. Electrical System Roughing-in: Coordinate layout and installation of power door operators with connections to the following:

Power supplies.

Retain subparagraphs below to suit Project.

Access-control system.

Remote activation devices.

Remote monitoring systems.

Retain "Pneumatic System Roughing-in" paragraph below for pneumatic operating system.

* + - * 1. Pneumatic System Roughing-in: Coordinate layout and installation of power door operators and power units with compressed-air piping.
      1. PREINSTALLATION MEETINGS

Retain "Preinstallation Conference" paragraph below if Work of this Section is extensive or complex enough to justify a conference.

* + - * 1. Preinstallation Conference: Conduct conference at Project site.
      1. SUBMITTALS
         1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
         2. Manufacturer’s installation instructions shall be provided along with product data.
         3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
         4. Product Data: For each type of product.

Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for power door operators.

Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

Manufacturer’s installation instructions.

* + - * 1. Shop Drawings: For power door operators.

Include plans, elevations, sections, hardware mounting heights, and attachment details.

Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

Indicate locations of activation and safety devices.

Include diagrams for power, signal, and control wiring.

Retain subparagraph below for power door operators if guide rails are provided by operator manufacturer.

Include plans, elevations, sections, and attachment details for guide rails.

Retain "Samples" paragraph below for single-stage Samples, with a subordinate list if applicable.

* + - * 1. Samples: For each exposed product and for each color and texture specified, [**manufacturer's standard size**] <**Insert dimensions**>.
        2. Quality Control Submittals

Retain "Product Certificates" paragraph below to require submittal of product certificates from manufacturers. Retain option if operators for fire-rated door assemblies are required.

Product Certificates: For each type of power door operator.[ For each operator for fire-rated door assemblies, certify that operator is listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for use on types and sizes of labeled fire doors required.]

Field quality-control reports.

Sample Warranties: For manufacturer's special warranties.

* + - * 1. Contract Closeout Submittals

Maintenance Data: For power door operators, safety devices, and control systems, to include in maintenance manuals.

* + - 1. QUALITY ASSURANCE
         1. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation and maintenance of units required for this Project[**and who employs a Certified Inspector**].

Revise "Maintenance Proximity" subparagraph below if retaining "Maintenance Service" Article.

Maintenance Proximity: Not more than [**two**] <**Insert number**> hours' normal travel time from Installer's place of business to Project site.

Retain "Certified Inspector Qualifications" paragraph below if retaining option in "Installer Qualifications" paragraph above, if retaining "Certified Inspector" paragraph in "Field Quality Control" Article, or if retaining "Maintenance Service" Article.

* + - * 1. Certified Inspector Qualifications: Certified by AAADM.
      1. WARRANTY

When warranties are required, verify with Director’s Representative's counsel that warranties stated in this article are not less than remedies available to Director’s Representative under prevailing local laws.

* + - * 1. Special Warranty: Manufacturer agrees to repair or replace components of power door operators that fail in materials or workmanship within specified warranty period.

Failures include, but are not limited to, the following:

Faulty or sporadic operation of power door operator, including controls.

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

Verify available warranties and warranty periods for units and components.

Warranty Period: [**Two**] <**Insert number**> years from date of Substantial Completion.

1. PRODUCTS

Manufacturers and products listed in this Section are neither recommended nor endorsed by the AIA or Deltek. Before selecting manufacturers and products, verify availability, suitability for intended applications, and compliance with minimum performance requirements.

Product options commonly available from manufacturers are included in square brackets throughout the Section Text. Not every manufacturer listed can provide every option offered; verify availability with manufacturers.

* + - 1. MANUFACTURERS

Generally, retain first option in "Source Limitations" paragraph below if required. Verify capabilities of manufacturers before retaining second option below.

* + - * 1. Source Limitations: Obtain power door operators, including activation and safety devices, from [**single source from single manufacturer.**] [**same manufacturer as for hardware in Section 087100 "Door Hardware."**]
      1. POWER DOOR OPERATORS, GENERAL

Retain requirements in this article that apply to power door operators retained in other articles; revise to suit Project.

If additional data, such as door size and weight, cycles per hour, and maximum wind velocity, are available, revise "General" paragraph below to include requirements.

* + - * 1. General: Provide operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for occupancy type indicated; and in accordance with UL 325. Coordinate operator mechanisms with door operation, hinges, and activation and safety devices.

Retain "Emergency Breakaway" subparagraph below if emergency breakaway is required. Doors with emergency breakaway feature swing in the opposite direction of normal automatic swing and must be center pivoted.

Emergency Breakaway: Where indicated for center-pivoted doors, provide emergency breakaway feature for reverse swing of doors. Equip system to discontinue power to power door operator when door is in emergency breakaway position, to return door to closed position after breakaway, and to automatically reset.

Retain "Fire-Rated Doors" subparagraph below if operators for fire-rated door assemblies are required.

Fire-Rated Doors: Provide door operators for fire-rated door assemblies that comply with NFPA 80 for fire-rated door components and are listed and labeled by a qualified testing agency.

Retain "Wind Load" subparagraph below for exterior doors to suit Project. Coordinate with Director’s Representative and Design Team for wind conditions under which doors are expected to operate.

Wind Load: Provide door operators on exterior doors that will open and close doors and maintain them in fully closed position when subjected to wind load of <**Insert wind load**>.

Retain one or more of "Electromechanical Operating System," "Electrohydraulic Operating System," and "Pneumatic Operating System" paragraphs below. If retaining more than one, indicate location of each on Drawings or by inserts.

* + - * 1. Electromechanical Operating System: Self-contained unit powered by permanent-magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor, connections for power and activation- and safety-device wiring, and manual operation, including spring closing when power is off.
        2. Electrohydraulic Operating System: Self-contained, low-pressure unit; with separate cylinders for power and checking, connections for power and activation- and safety-device wiring, and manual operation, including spring closing when power is off.
        3. Pneumatic Operating System: Pneumatic operator, air opened and spring closed; with checking in both cycles and manual operation when power is off.

Power Unit:

Retain one of two subparagraphs below; revise to suit Project.

Control box and compressor unit, complete with tank, compressor, air line to operator, motor, regulator, safety valve, pressure cutoff switch, and automatic air-line filter drain.

Remote-control box powered by compressed-air system specified in Section 221513 "General-Service Compressed-Air Piping" and Section 221519 "General-Service Packaged Air Compressors and Receivers."

Some manufacturers of power door operators offer pivot hinges as part of their door-operator package. Revise "Hinges" paragraph below if pivot hinges are included in the Work of this Section; coordinate with Sections specifying doors, entrances, and hardware.

* + - * 1. Hinges: See Section 087100 "Door Hardware" for hinge type for each door that door operator shall accommodate.

Retain "Housing for Overhead Concealed Operators" paragraph below for overhead concealed door operators.

* + - * 1. Housing for Overhead Concealed Operators: Fabricated from minimum 0.125-inch-thick, extruded or formed aluminum and extending full width of door opening, including door jambs, to conceal door operators and controls. Provide hinged or removable access panels for service and adjustment of door operators and controls. Secure panels to prevent unauthorized access.

Retain "Cover for Surface-Mounted Operators" paragraph below for surface-mounted door operators. Second and third options may be custom configurations for some manufacturers' models.

* + - * 1. Cover for Surface-Mounted Operators: Fabricated from 0.125-inch-thick, extruded or formed aluminum[**; manufacturer's standard width**] [**; continuous over full width of operator-controlled door opening**] [**; continuous over full width of door opening, including door jambs**]; with enclosed end caps, provision for maintenance access, and fasteners concealed when door is in closed position.
        2. Brackets and Reinforcements: Fabricated from aluminum with nonstaining, nonferrous shims for aligning system components.

Retain "Fire-Door Package" paragraph below, for fire doors, to suit Project; coordinate requirements with door hardware specified in other Sections for fire doors. Fire-rated door applications require that doors and frames are fire rated and equipped with fire-exit hardware, including power door operators, and equipped with automatic fire detectors on each side of the door.

* + - * 1. Fire-Door Package: Consisting of UL-listed latch mechanism, power-reset box, and caution signage for fire-rated doors. Latch mechanism shall allow door to swing free during automatic operation; when fire is detected, latch actuator shall cause exit hardware to latch when door closes. Provide latch actuators with fail-secure design.
        2. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
      1. POWER DOOR OPERATORS FOR SWINGING DOORS

See the Power Door Operators Table at the end of the Evaluations for a list of manufacturers' products. Use this table in combination with manufacturers' catalogs or product data to insert series, type, model, and designations of other characteristics.

Retain applicable requirements in this article; revise to suit Project. Verify requirements of authorities having jurisdiction.

* + - * 1. Standard: BHMA A156.10.
        2. Performance Requirements:

Opening Force:

"Power-Operated Doors" subparagraph below is in accordance with the BCNYS and NFPA 101 for means-of-egress doors. The BCNYS also requires compliance with BHMA A156.10.

Power-Operated Doors: Not more than 50 lbf required to manually set door in motion if power fails; not more than 15 lbf required to open door to minimum required width.

"Power-Operated Swinging Doors" and "Breakaway Device for Power-Operated Doors" subparagraphs below are based on BHMA A156.10. Retain one or both to suit Project.

Power-Operated Swinging Doors: Not more than 30 lbf required to manually open door if power fails.

Breakaway Device for Power-Operated Doors: Not more than 50 lbf required for breakaway door or panel to open.

"Entrapment-Prevention Force" subparagraph below is based on BHMA A156.10.

Entrapment-Prevention Force: Not more than 40 lbf required to prevent stopped door in the last 10 degrees of opening from moving in the direction of opening; not more than 30 lbf required to prevent stopped door from moving in direction of closing.

Requirements in "Configuration" paragraph below affects hardware and signage requirements. Indicate arrangement and location of doors on Drawings.

* + - * 1. Configuration: Operator to control [**single swinging door**] [**pair of swinging doors**].

Traffic Pattern: [**One way**] [**Two way**] [**Double swing**] [**Double egress**].

Operator Mounting: [**Surface**] [**Overhead concealed**].

* + - * 1. Operation: Power opening and[**power-assisted**] spring closing. Provide time delay for door to remain open before initiating closing cycle as required by BHMA A156.10.
        2. Operating System: [**Electromechanical**].

Retain "Microprocessor Control Unit" paragraph below if required.

* + - * 1. Microprocessor Control Unit: Solid-state controller.
        2. Features:

Consult manufacturers on need for adjustability and availability of adjustability for specific applications.

Adjustable [**opening**] [**and**] [**closing**] speed.

Adjustable [**opening**] [**and**] [**closing**] force.

Adjustable backcheck.

Adjustable hold-open time from zero to 30 seconds.

Adjustable time delay.

Adjustable acceleration.

Adjustable limit switch.

Obstruction recycle.

Power door re-open if stopped while closing.

On-off/hold-open switch to control electric power to operator[**; key operated**].

<**Insert feature**>.

* + - * 1. Controls: Activation and safety devices [**as indicated on Drawings and**]in accordance with BHMA standards.

Retain option in "Controls" paragraph above, or retain "Activation Device, Motion Sensor," or "Activation Device, Switch" subparagraph below with "Safety Device, Presence Sensor," "Safety Device, Photoelectric Beam," or "Safety Device, Control Mat(s)" subparagraph below. Consult manufacturers for recommendations; revise to suit Project.

Motion sensor is the most common activation device, and wall push-plate switch or touchless switch is often used for clean rooms. Key switch is usually a supplementary activation device.

Activation Device, Motion Sensor: Mounted on ingress side of door header to detect pedestrians in activating zone and to open door.

Activation Device, Switch: [**Push-plate switch**] [**Touchless switch**] [**Push-button switch**] [**Key switch**] [**on each side of door**]to activate door operator.

Safety Device, Presence Sensor: Mounted on [**door header**] [**horizontal door muntin**] [**guide rail**] to detect pedestrians in presence zone and to prevent door from closing.

Safety Device, Photoelectric Beam: One photoelectric beam mounted in guide rails to detect pedestrians in presence zone and to prevent door from closing.

Revise "Exposed Finish" paragraph below if different finish is required for components of power door operators. If more than one finish is required, indicate location of each on Drawings, in schedules, or by inserts.

* + - * 1. Exposed Finish: [**Class I, clear anodic finish**] [**Class II, clear anodic finish**] [**Class I, color anodic finish**] [**Class II, color anodic finish**] [**Baked-enamel or powder-coat finish**] [**Metal cladding**] [**Finish matching door and frame**] [**Finish matching door hardware**] <**Insert finish**>.

Retain "Color" or "Metal Cladding" subparagraph below; delete both for clear anodic finishes. Color anodic finishes may vary in color range and availability among manufacturers.

Color: [**Light bronze**] [**Medium bronze**] [**Dark bronze**] [**Black**] [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors and color densities**] <**Insert color**>.

Retain "Metal Cladding" subparagraph below only for metal-clad finish; verify availability with manufacturers before specifying.

Metal Cladding: [**No. 4, directional-satin-finish stainless steel**] [**No. 8, mirrorlike-reflective, nondirectional-polish-finish stainless steel**] [**Satin brass**] [**Polished brass**] [**Satin bronze**] [**Polished bronze**] <**Insert finish**>.

* + - 1. LOW-ENERGY DOOR OPERATORS FOR SWINGING DOORS

See the Power Door Operators Table at the end of the Evaluations for a list of manufacturers' products. Use this table in combination with manufacturers' catalogs or product data to insert series, type, model, and designations of other characteristics.

Retain applicable requirements in this article; revise to suit Project. Verify requirements of authorities having jurisdiction.

Revise this article and article title if low-energy, power-open door operators that rely on a separate closing device are required; coordinate with Section 087100 "Door Hardware."

* + - * 1. Standard: BHMA A156.19.
        2. Performance Requirements:

Generally, retain "Opening Force if Power Fails" and "Entrapment-Prevention Force" subparagraphs below. The BCNYS requires compliance with BHMA A156.19; both subparagraphs are based on BHMA A156.19.

Opening Force if Power Fails: Not more than 15 lbf required to release latch if provided, not more than 30 lbf required to manually set door in motion, and not more than 15 lbf required to fully open door.

Entrapment-Prevention Force: Not more than 15 lbf required to prevent stopped door from closing or opening.

Retain "Configuration, Single" paragraph or "Configuration, Pair" paragraph below. Configuration affects hardware and signage requirements. Indicate arrangement and location of doors on Drawings.

* + - * 1. Configuration, Single: Operator to control single swinging door.

Traffic Pattern: [**One**] [**Two**] way.

Operator Mounting: [**Surface**] [**Overhead concealed**].

BHMA A156.19 does not specifically address pairs of swinging doors. Consult manufacturers and authorities having jurisdiction for recommendations.

* + - * 1. Configuration, Pair: Operator to control pair of swinging doors.

Traffic Pattern: [**One way**] [**Two way**] [**Double egress**] [**Double swing**].

Operator Mounting: [**Surface**] [**Overhead concealed**].

Delete closing requirements in "Operation" paragraph below if revising this article for low-energy, power-open door operators.

* + - * 1. Operation: Power opening and[**power-assisted**] spring closing. Provide time delay for door to remain open before initiating closing cycle as required by BHMA A156.19. When not in automatic mode, door operator shall function as manual door closer, with or without electrical power.
        2. Operating System: Electromechanical.
        3. Microprocessor Control Unit: Solid-state controller.
        4. Features:

Consult manufacturers on need for adjustability and availability of adjustability for specific applications.

Adjustable [**opening**] [**and**] [**closing**] speed.

Adjustable [**opening**] [**and**] [**closing**] force.

Adjustable backcheck.

Adjustable hold-open time from zero to 30 seconds.

Adjustable time delay.

Adjustable acceleration.

Obstruction recycle.

On-off/hold-open switch to control electric power to operator[**; key operated**].

<**Insert feature**>.

Revise "Activation Device" paragraph below to suit Project. Low-energy doors are seldom used with other activation devices, although it is not disallowed by BHMA A156.19. If another activation device is required, insert requirements.

* + - * 1. Activation Device: [**Push-plate switch**] [**Touchless switch**] [**Push-button switch**] [**Key switch**] [**on each side of door**] to activate door operator.

Low-energy doors are not required by BHMA A156.19 to have auxiliary safety devices. If auxiliary safety devices are required, insert requirements here.

Revise "Exposed Finish" paragraph below if different finish is required for components of power door operators. If more than one finish is required, indicate location of each on Drawings, in schedules, or by inserts.

* + - * 1. Exposed Finish: [**Class I, clear anodic finish**] [**Class II, clear anodic finish**] [**Class I, color anodic finish**] [**Class II, color anodic finish**] [**Baked-enamel or powder-coat finish**] [**Metal cladding**] [**Finish matching door and frame**] [**Finish matching door hardware**] <**Insert finish**>.

Retain "Color" or "Metal Cladding" subparagraph below; delete both for clear anodic finishes. Color anodic finishes may vary in color range and availability among manufacturers.

Color: [**Light bronze**] [**Medium bronze**] [**Dark bronze**] [**Black**] [**As indicated by manufacturer's designations**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors and color densities**] <**Insert color**>.

Retain "Metal Cladding" subparagraph below only for metal-clad finish; verify availability with manufacturers before specifying.

Metal Cladding: [**No. 4, directional-satin-finish stainless steel**] [**No. 8, mirrorlike-reflective, nondirectional-polish-finish stainless steel**] [**Satin brass**] [**Polished brass**] [**Satin bronze**] [**Polished bronze**] <**Insert finish**>.

* + - 1. MATERIALS
         1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

Extrusions: ASTM B221.

Sheet: ASTM B209.

Retain one or more of "Stainless Steel Sheet," "Brass Sheet," and "Bronze Sheet" paragraphs below for metal-clad finishes.

* + - * 1. Stainless Steel Sheet: ASTM A240 or ASTM A666, [**Type 304**] <**Insert alloy type**>, stretcher-leveled standard of flatness, in manufacturer's standard thickness.

Retain "Brass Sheet" paragraph below for brassy yellow color; revise to suit Project.

* + - * 1. Brass Sheet: ASTM B36, Alloy UNS No. C26000 (cartridge brass, 70 percent copper), in manufacturer's standard thickness.

Retain "Bronze Sheet" paragraph below for bronze look. Neither alloy below is a true tin bronze, but both closely match color of extruded architectural bronze (also not a true tin bronze). Revise if only one of two alloys is acceptable, or specify another alloy.

* + - * 1. Bronze Sheet: ASTM B36, Alloy UNS No. C28000 (muntz metal, 60 percent copper) or Alloy UNS No. C23000 (red brass, 85 percent copper), in manufacturer's standard thickness.

Retain "Expanded Aluminum Mesh" or "Polycarbonate Sheet" paragraph below for guide-rail infill panel if required. Revise to suit Project, or insert another material if required.

Options in "Expanded Aluminum Mesh" paragraph below are types included in ASTM F1267.

* + - * 1. Expanded Aluminum Mesh: [**Expanded**] [**Expanded and flattened**] aluminum sheet in accordance with the geometry of ASTM F1267.
        2. Polycarbonate Sheet: ASTM C1349, Appendix X1, Type II, coated, mar-resistant, UV-stabilized polycarbonate with coating on both surfaces.
        3. Fasteners and Accessories: Corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
      1. CONTROLS

Retain one or more activation and safety devices in this article; available devices vary among manufacturers. Safety devices are not required for power-assist or low-energy doors. Generally, indicate location of each device for each door opening on Drawings, because some devices can be used for both activation and safety. Coordinate with devices retained, if any, in "Power Door Operators for Swinging Doors," "Low-Energy Door Operators for Swinging Doors," and "Power-Assist Door Operators for Swinging Doors" articles. Consult manufacturers and revise retained paragraphs to suit Project.

* + - * 1. General: Provide controls, including activation and safety devices, in accordance with BHMA standards; for condition of exposure; and for long-term, maintenance-free operation under normal traffic load for occupancy type indicated. Coordinate activation and safety devices with door operation and door operator mechanisms.
        2. Motion Sensors: Self-contained, K-band-frequency, microwave-scanner units; fully enclosed in plastic housing; adjustable to provide detection field sizes and functions required by BHMA A156.10.

Provide capability for switching between bidirectional and unidirectional detection.

For one-way traffic, sensor on egress side shall not be active when doors are fully closed.

* + - * 1. Presence Sensors: Self-contained, active-infrared scanner units; adjustable to provide detection field sizes and functions required by BHMA A156.10. Sensors shall remain active at all times.
        2. Photoelectric Beams: Pulsed infrared, sender-receiver assembly for recessed mounting. Beams shall not be active when doors are fully closed.

Mats and activation switches in "Push-Plate Switch," "Touchless Switch," "Push-Button Switch," "Key Switch," and "Wireless or Remote Radio-Control Switch" paragraphs below vary among manufacturers. Consult manufacturers and revise retained devices to suit Project.

* + - * 1. Push-Plate Switch: Momentary-contact door control switch with flat push-plate actuator[**with contrasting-colored, engraved message**].

Configuration:

Retain one of first two subparagraphs below. Insert mounting height for wall switches if not indicated on Drawings.

[**Round**] [**Square**] push plate with 4-by-4-inch junction box.

Mounting: [**As indicated on Drawings**] [**Recess mounted, semiflush in wall**] [**Surface mounted on wall**].

Rectangular push plate with 2-by-4-inch junction box.

Mounting: [**As indicated on Drawings**] [**Recess mounted, semiflush in wall**] [**Recess mounted in door jamb**] [**Surface mounted on wall**] [**Surface mounted on post**] [**Surface mounted on guide rail**].

Push-Plate Material: [**Stainless steel**] [**Plastic**] as selected by Director’s Representative from manufacturer's full range.

Message: [**Plain face with no message.**] [**"Push to Open."**] [**International symbol of accessibility.**] [**International symbol of accessibility and "Push to Open."**]

* + - * 1. Touchless Switch: Hands-free activation door-control switch with flat motion sensor face-plate[**with contrasting-colored, engraved message**].

Configuration: [**6-inch round**] [**4.56-by-4.56-inch (double gang) square**] [**2.77-by-4.56-inch (single gang) rectangular**] [**1.68-by-4.56-inch jamb-style**] face plate.

Insert mounting height for wall switches in "Mounting" subparagraph below if not indicated on Drawings.

Mounting: [**As indicated on Drawings**] [**Recess mounted in wall**] [**Recess mounted in door jamb**] [**Surface mounted on wall**].

Face-Plate Material: [**Stainless steel**] [**Plastic**] [**Stainless steel with backlight acrylic window**] [**As selected by Director’s Representative from manufacturer's full range of options**].

Message: [**"Wave to Open."**] [**"Wave to Open" and wave symbol.**] [**International symbol of accessibility.**] [**International symbol of accessibility and "Wave to Open" and wave symbol.**]

* + - * 1. Push-Button Switch: Momentary-contact door control switch with one red-button actuator; enclosed in nominal [**2-by-4-inch**] [**4-by-4-inch**] junction box.

Provide faceplate engraved with "Press to Open" text[**and international symbol of accessibility**] in contrasting color.

Provide blue plastic cover engraved with "Press Button to Open" in white text and with international symbol of accessibility.

Mounting: [**As indicated on Drawings**] [**Surface mounted on wall**] [**Surface mounted on post**] [**Surface mounted on guide rail**] [**Recess mounted in wall**].

Faceplate Material: [**Stainless steel**] [**Painted metal**] as selected by Director’s Representative from manufacturer's full range.

* + - * 1. Key Switch: Recess-mounted, door control switch with key-controlled actuator; enclosed in 2-by-4-inch junction box. Provide faceplate engraved with text indicating switch functions.

Faceplate Material: [**Stainless steel**] [**Painted metal**] as selected by Director’s Representative from manufacturer's full range.

Functions: [**On-off, momentary contact**] [**On-off, maintained contact**] [**Two-way automatic, hold open, one-way exit, and off**] [**Two-way automatic, hold open, one-way exit, off, full open, and partial open**].

Mounting: [**As indicated on Drawings**] [**Recess mounted, semiflush in wall**] [**Recess mounted in door jamb**] [**Surface mounted on wall**] [**Surface mounted on post**].

* + - * 1. Wireless or Remote Radio-Control Switch: Radio-control system consisting of header-mounted receiver and [**wall-mounted**] [**handheld, battery-operated**] transmitter switch.

Wall-Mounted Transmitter Switch: One red-button, momentary-contact actuator enclosed in 4-by-4-inch junction box. Provide blue plastic cover engraved with "Press Button to Open" in white text and with international symbol of accessibility.

If required, insert another type of sensing device or switch; verify availability with manufacturers.

* + - * 1. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

If needed, insert requirements for pull-cord and floor switches. These devices are typically used only for industrial applications.

* + - 1. ACCESSORIES

Always retain "Signage" paragraph below.

* + - * 1. Signage: As required by cited BHMA standard for type of door and its operation.

First option in "Application Process" subparagraph below is most common.

Application Process: [**Decals**] [**Silk-screened**] [**Operator manufacturer's standard process**] <**Insert requirement**>.

Retain subparagraph below for field-installed signs.

Provide sign materials with instructions for field application when operators are installed.

* + - * 1. Guide Rails:

Retain one of two subparagraphs below if guide rails are required. Guide rails are not required for power-assist or low-energy doors. However, guide rails might still be useful in some door layout conditions and where using mats.

[**Anodized aluminum**] [**Baked-enamel or powder-coated aluminum**] [**Stainless steel**], fabricated from [**bars**] [**or**] [**tubing**], minimum 30 inches high, and finished to match doors unless otherwise indicated; positioned and projecting from face of door jamb for distance as indicated, but not less than [**that required by BHMA A156.10 for type of door and direction of travel**] <**Insert requirement**>; with filler panel.

Filler Panel: [**Expanded aluminum mesh**] [**Clear polycarbonate sheet**] [**Colored polycarbonate sheet**] <**Insert material**>.

Retain first subparagraph below if required; delete if indicated on Drawings.

Orient expanded aluminum mesh with long dimension of diamonds [**parallel**] [**perpendicular**] to top rail.

Color: [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from manufacturer's full range**] <**Insert color**>.

Retain first subparagraph below if this type of photoelectric-beam support is required.

Provide intermediate guide rail suitable for supporting photoelectric beams.

Mounting: [**As indicated on Drawings**] [**Jamb and floor**] [**Floor, freestanding**].

Retain "Aluminum Finish" or "Stainless Steel Finish" subparagraph below; revise to suit Project.

Aluminum Finish: [**Class I, clear anodic finish**] [**Class II, clear anodic finish**] [**Class I, color anodic finish**] [**Class II, color anodic finish**] [**Baked-enamel or powder-coat finish**] [**Finish matching door and frame**] <**Insert finish**>.

Retain "Color" subparagraph below for color anodic finishes, which may vary in color range and availability among manufacturers; delete for clear anodic finishes.

Color: [**Light bronze**] [**Medium bronze**] [**Dark bronze**] [**Black**] [**Match Director’s Representative's sample**] [**As selected by Director’s Representative from full range of industry colors and color densities**] <**Insert color**>.

Stainless Steel Finish: [**No. 4, directional-satin-finish stainless steel**] [**Finish matching door and frame**] <**Insert finish**>.

If retaining subparagraph below, verify that design and layout of guide rail complies with BHMA A156.10.

See [**Section 055213 "Pipe and Tube Railings."**].

* + - 1. FABRICATION
         1. Factory fabricate power door operators to comply with indicated standards.
         2. Form aluminum shapes before finishing.
         3. Fabricate exterior components to drain condensation and water-passing joints within operator enclosure to the exterior.
         4. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws, finished to match operator.

Retain paragraph below for metal-clad finishes.

* + - * 1. Provide metal cladding, completely covering visible surfaces before shipment to Project site. Fabricate cladding with concealed fasteners and connection devices, with accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion, and with allowance for thermal expansion at exterior doors.
      1. GENERAL FINISH REQUIREMENTS
         1. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary, protective covering before shipping.

Retain first paragraph below for coatings and anodic finishes.

* + - * 1. Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.
        2. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.
      1. ALUMINUM FINISHES

If retaining more than one finish in paragraphs below, indicate location of each on Drawings or by inserts.

Retain one of two options in "Clear Anodic Finish" paragraph below. Verify availability with manufacturers.

* + - * 1. Clear Anodic Finish: AAMA 611, [**AA-M12C22A41, Class I, 0.018 mm**] [**AA-M12C22A31, Class II, 0.010 mm**] or thicker.

Retain one of two options in "Color Anodic Finish" paragraph below. Verify availability with manufacturers.

* + - * 1. Color Anodic Finish: AAMA 611, [**AA-M12C22A42/A44, Class I, 0.018 mm**] [**AA-M12C22A32/A34, Class II, 0.010 mm**] or thicker.

"Baked-Enamel or Powder-Coat Finish" paragraph below references AAMA standard for pigmented organic coating on extrusions and panels.

* + - * 1. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

If needed, insert requirements for high-performance organic finish (fluoropolymer) to match doors and frames. Verify availability with manufacturers. Some manufacturers indicate that they offer powder-coat finish to match high-performance organic finishes; they also offer plated and metal-clad finishes.

1. EXECUTION
   * + 1. EXAMINATION
          1. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, door and frame preparation and reinforcements, and other conditions affecting performance of power door operators.
          2. Examine roughing-in for electrical systems to verify actual locations of power connections before power door operator installation.

Retain first paragraph below if pneumatic operators are required.

* + - * 1. Examine roughing-in for compressed-air piping systems to verify actual locations of piping connections before power door operator installation.

Retain first paragraph below for doors with pivot hinges.

* + - * 1. Verify that full-height finger guards are installed at each door with pivot hinges, where door has a clearance at hinge side greater than 1/4 inch and less than 3/4 inch with door in any position.
        2. Proceed with installation only after unsatisfactory conditions have been corrected.
      1. INSTALLATION, GENERAL
         1. Install power door operators in accordance with manufacturer's written instructions and cited BHMA standard for type of door operation and direction of pedestrian travel, including signage, controls, wiring, remote power units if any, and connection to building's power supply.

Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion.

Install operators true in alignment with established lines and door geometry without warp or rack. Anchor securely in place.

* + - * 1. Controls: Install activation and safety devices in accordance with manufacturer's written instructions and cited BHMA standard for operator type and direction of pedestrian travel. Connect control wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
        2. Signage: Apply on both sides of each door as required by cited BHMA standard for type of door operator and direction of pedestrian travel.

Retain "Guide Rails" paragraph below if specifying guide rails in Part 2. Delete if specifying guide rails in another Section.

* + - * 1. Guide Rails: Install in accordance with BHMA A156.10, including Appendix A and manufacturer's written instructions unless otherwise indicated.
      1. FIELD QUALITY CONTROL

Retain "Certified Inspector" and "Perform the following tests and inspections" paragraphs below. Certified Inspector: Engage a Certified Inspector to test and inspect components, assemblies, and installations, including connections.

Retain "Perform the following tests and inspections" paragraph below to require Contractor to perform tests and inspections.

* + - * 1. Perform the following tests and inspections[**with the assistance of a Company Service Advisor**]:

Test and inspect each power door operator installation, using AAADM inspection forms, to determine compliance of installed systems with applicable BHMA standards.

* + - * 1. Power door operators will be considered defective if they do not pass tests and inspections.
        2. Prepare test and inspection reports.
      1. ADJUSTING
         1. Adjust power door operators to function smoothly, and lubricate as recommended by manufacturer; comply with requirements of applicable BHMA standards.

Retain subparagraph below for exterior doors.

Adjust operators on exterior doors for tight closure.

* + - * 1. After completing installation of power door operators, inspect exposed finishes on doors and operators. Repair damaged finish to match original finish.
        2. Readjust power door operators and controls after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles).
        3. Occupancy Adjustment: When requested within [**12**] <**Insert number**> months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to [**two**] <**Insert number**> visits to Project during other-than-normal occupancy hours for this purpose.
      1. DEMONSTRATION
         1. Engage a Company Service Advisor to train Director’s Representative's maintenance personnel to adjust, operate, and maintain power door operators.

END OF SECTION 087113