

**SECTION 08 71 13.11  
LOW ENERGY POWER ASSIST DOOR OPERATORS**

SPEC WRITER NOTES:

1. Use this section only for NCA projects.
2. Delete between // ----// if not applicable to project. Also delete any other item or paragraph not applicable in the section and renumber the paragraphs.

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies low energy power assisted automatic operation of swing doors. Provide complete door operator system including operator, controls, door arm and operator enclosure (header and cover).

**1.2 RELATED WORK**

- A. Sealants: Section 07 92 00, JOINT SEALANTS.
- B. Steel doors: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES.
- C. Wood doors: Section 08 14 00, INTERIOR WOOD DOORS.
- D. Aluminum frames entrance work: Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS.
- E. Door hardware: Section 08 71 00, DOOR HARDWARE.
- F. Glass and glazing of doors and frames: Section 08 80 00, GLAZING.
- G. Finish Color: Section 09 06 00, SCHEDULE FOR FINISHES.
- H. Smoke detectors for control of fire/smoke doors to be wired per Section 28 31 00, FIRE DETECTION AND ALARM.
- I. Electric general wiring, connections and equipment requirements: Division 26, ELECTRICAL.

**1.3 MANUFACTURER'S QUALIFICATIONS**

- A. Power assisted door operators, controls and other equipment must be products of a manufacturer regularly engaged in manufacturing such equipment for a minimum of three years.
- B. Use one manufacturer of automatic door equipment throughout the building // project //.

**1.4 WARRANTY**

- A. Power assisted door operators, controls and other related equipment are subject to the terms of the "Warranty of Construction", FAR clause 52.246-21, except that the warranty period to be two years instead of one year.

**1.5 MAINTENANCE MANUALS**

- A. In accordance with Section 01 00 00, GENERAL REQUIREMENTS, Article titled "INSTRUCTIONS," furnish // two // three // copies of maintenance manuals and instructions on automatic door operators.

**1.6 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Submit manufacturer's literature and data describing operators, power units, controls, door hardware and safety devices.
- C. Shop Drawings:
1. Show location of controls and safety devices in relationship to each automatically operated door; this includes templates, wiring diagrams, fabrication details, anchorage and other information to providers of related work to coordinate the proper installation of the door operators.
  2. Include wiring or interface requirements for security devices such as card reader, remote release, fire alarm systems, if applicable.

**1.7 DESIGN CRITERIA**

- A. Power assisted automatic door equipment to accommodate normal traffic as well as the weight of the doors.
- B. Equipment: UL approved and comply with applicable codes.
- SPEC WRITER NOTES:
1. 1/8 HP "heavy duty operator" is appropriate for most exterior entrances.
  2. 1/4 HP is only appropriate or needed for very heavy door leaves, greater than 250 lbs.
- C. Motors: Rated minimum 1/8 horsepower; single phase and 115 volts.
- D. Electrical Wiring: Provide wiring so that only a single power supply is required; equipment and wiring as specified in Division 26, ELECTRICAL.

**1.8 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by the basic designation only. Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

## SPEC WRITER NOTES:

1. Remove reference citations that do not remain in Part 2 or Part 3 of edited specification.
2. Verify and make dates indicated for remaining citations the most current

at date of submittal; determine changes from date indicated on the TIL download of the section and modify requirements impacted by the changes.

- B. American Association of Automatic Door Manufacturers (AAADM).
- C. American National Standards Institute (ANSI):
  - ICC/ANSI A117.1-03      Guideline for Accessible and Usable Buildings and Facilities-Providing Accessibility and Usability for Physically Handicapped People
  - ANSI 156.19-07      Power Assist and Low Energy Power Operated doors
- D. 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.
- E. Power-Operated Door Standard: BHMA A156.10.
- F. Power-Assist and Low-Energy Door Standard: BHMA A156.19.

## **PART 2 - PRODUCTS**

### **SPEC WRITERS NOTES:**

1. Low energy automatic door operators are not recommended for high traffic doors. Coordinate door locations and operations with NCA staff. Doors must have hardware for manual operation in event of power failure. Provide door hardware and door operators by manufacturer of existing products where possible. Discuss with the NCA staff for emergency power requirement.

### **2.1 OPERATORS**

- A. Automatic door operators must be for commercial doors, electromechanical and surface mounted above the door to the header or transom bar. Generate the opening force with a permanent magnet DC motor driving a combination spiral bevel/spur gear reducer and transmitted to the door through an arm linkage.
  1. Opening speed must be adjustable and feature dual backcheck control allowing adjustment of backcheck speed and position.
  2. Provide closing by spring force generated with a metal compression spring; the spring must reduce manual opening force to not more than 67 N (15 lbf). The minimum diameter of spring wire cannot be less than 0.007mm (172 in.). Under the specified design load of the door,

- the spring must be capable of performing 2,000,000 cycles before fracture.
3. Control the door in the closing cycle with adjustable closing speed and fixed latch speed.
  4. The doors must be operated manually at any time without damage to the operator or components.
- B. Provide operators with checking mechanism providing cushioning action at last part of door travel, in both opening and closing cycle. Operators must recycle doors instantaneously to full open position from any point in closing cycle when control switch is reactivated.
- C. Operator to be swinging type enclosed in housing. Operator to open door by energizing motor; stopping by electrically reducing voltage and stalling motor against mechanical stop. Door to close by means of spring energy; control close force by gear system and motor being used as dynamic break without power. System must operate as manual door control in event of power failure. Opening and closing speeds must be adjustable:
1. Swing Operator Housing: Aluminum extrusions with enclosed end caps for application to frame systems. Provide structural sections fabricated of 6063-T5 aluminum alloy, with a minimum thickness of 3.7 mm (0.146 inch).
  2. Swing Power Operator: Completely assembled and sealed unit including helical gear drive transmission, mechanical spring and bearings in cast aluminum case and filled with special lubricant for extreme temperature conditions. Attach a "DC" shunt-wound permanent magnet motor with sealed ball bearings to transmission system. Rubber mount complete unit with provisions for easy maintenance and replacement - without removing door from pivots or frame.
  3. Connecting hardware for swing overhead concealed type power operator to have drive arm attached to door with a pin linkage rotating in a self-lubricating bearing and adjustable slide block, traveling in an interconnected track and top pivot assembly. Fabricate top track and pivot assembly of steel. Door must not pivot on shaft of operator.
  4. Electrical Control: Provide operator with a self-contained electrical control unit, including necessary transformers, relays, rectifiers, and other electronic components for proper operation and switching of power operator. Provide plug-in type relays for individual replacement; provide connecting harnesses with

interlocking plugs. Include time delay for normal cycle. Provide swing door control with safe-swing circuit and optional switching to automatically limit power - slows door when approached from the doors swing area.

5. On pairs of doors, allow either door to be opened manually without the other door opening.

## **2.2 MICROPROCESSOR CONTROLS**

- A. Provide system including a multi-function microprocessor control providing adjustable hold open time (1 - 30 sec.), LED indications for actual position unknown, system status, open obstruction shutdown, activation signal, safety mat/sensor signal, Stop-and-Hold signal, and mode selector switches providing a means for easy field selection of the following functions: push-to-operate, latch assist and stack pressure. Control must be capable of receiving activation signals from any device with normally open dry contact output.
  1. With push-to-operate function enabled, the control provides a means of initiating a self-start activation circuit by slightly pushing the door open at any point in the door swing.
  2. Latch Assist to provide a two second impulse in the close direction to overcome restrictions with locking devices of pressure differentials, allowing the unit to operate in standard time delay mode and permitting the door to close from the full open position, after the hold time is satisfied. All activation modes must provide fully adjustable opening speed.
- B. Hold door open by low voltage applied to the continuous duty motor. Include an adjustable safety circuit that monitors door operation and shuts the motor off if an open obstruction is sensed. Include a recycle feature the reopens the door if an obstruction is sensed at any point during its closing cycle. Include a standard three position toggle switch with functions for ON, OFF, and HOLD OPEN.

## **2.3 ENCLOSURE**

- A. Provide operator completely self-contained within an extruded aluminum housing (alloy 6063-T6) to conceal operator mechanism and mounting brackets and with removable access cover; overall maximum size of 140 mm (5-1/2 inches) wide by 150 mm (6 inches) deep. Header color must match adjacent storefront/frame finish.

## **2.4 ACTIVATION DEVICES**

SPEC WRITER NOTES:

1. An array of switch types is available
    - radio transmitter (wireless), touchless, etc.
  2. Review project requirements and types with RE/COR and modify following paragraph appropriately for project.
- A. Automatic: Opening cycle activated by pressing switches with international symbol of accessibility and "PRESS TO OPERATE DOOR" engraved on the faceplate. Install switches in a standard 2-gang electrical wall box and place in a location complying with ANSI A117.1; switches may be wall mounted or mounted on a free standing post or guard rail.
- B. Manual: Push-to-operate; manually pushing the door activates the automatic opening cycle. Door automatically closes after timer delay expires.
- C. Opening and closing force, measured 25 mm (1 inch) out from the lock stile of the door, must not exceed 67 N (15 lbf) to stop the door when operating in either direction or cycle.
- D. Opening Time: Field adjust so that opening time to back check or 80 degrees, whichever occurs first, is 3 seconds or longer as required in Table 1. Backcheck cannot occur before 60 degrees opening. Total opening time to fully open, as provided in Table II.
- E. Closing Time: Field adjust to close from 90 degrees to 10 degrees in 3 seconds or longer as required in Table 1.
1. Field adjust to close from 10 degrees to fully close position in not less than 1.5 seconds.
  2. Field adjusted to remain fully open for not less than 5 seconds.
  3. Table 1 provides speed settings for various widths and weights of doors for obtaining results complying with this paragraph.
- F. Cycle Tests:
1. Cycle test Low Energy Power Operated, Low Energy Power Open and Power Assist Operators for 300,000 cycles.
  2. Use the widest and heaviest door specified as a test specimen; narrower or lighter doors of the same configurations will be considered to meet the cycle test requirements.

## SPEC WRITERS NOTES:

1. Check requirements of NFPA-101 for clear width requirements in means of egress.

**Table 1**

Minimum Opening Time to Backcheck or 80 degrees, whichever occurs first and the Minimum Closing Time from 90 degrees to Latch Check or 10 degrees.

"D" Door Leaf Width- mm (inches)	"W" Door Weight in kg (pounds) Matrix Values are in seconds				
	(100) 45.4	(56.7) 125	(68.0) 150	(79.4) 175	(90.7) 200
(762) 30	3.0	3.0	3.0	3.0	3.5
(914) 36	3.0	3.5	3.5	4.0	4.0
(1067) 42	3.5	4.0	4.0	4.5	4.5

Doors of other weights and widths can be calculated using the formula;

$$T = DvW/133 \text{ in US units} \quad T = DvW/2260 \text{ in SI (metric) units}$$

Where: T= Time, seconds

D= Door width, mm (inches)

W= Door weight, kg (lbs)

The values for "T" time have been rounded up to the nearest half second.

These values are based on a kinetic energy of (1.25 lbf-ft).

**Table II**

Total Opening Time to Full Open Position

Backcheck at 60 degrees	Backcheck at 70 degrees	Backcheck at 80 degrees
Table 1 plus 2 seconds	Table 1 plus 1.5 seconds	Table 1 plus 1 second

Note: To determine maximum times from close to full open, adjust the operator as shown in the chart. Backcheck occurring at a point between positions in Table II must use the lowest setting. For example - if the backcheck occurs at 75 degrees, the full open is determined to be the time shown in Table 1 plus 1.5 seconds.

**2.5 POWER UNITS**

- A. Provide separate self-contained electric circuits for automatic operators located on each floor of the building. Interruption or failure of power circuits for operators located on one floor of the building must not interfere with continuous performance of automatic operated doors located on other floors. Capacity and size of power circuits must be in accordance with automatic operator manufacturer's specifications.

## 2.6 SAFETY DEVICES

- A. Time delay switches to be adjustable between 5 to 60 seconds and control closing cycle of doors.
- B. Install decals with sign "In" or "Do Not Enter" on both faces of each door where shown and conform to the requirements of ANSI/BHMA A156.19.

### SPEC WRITER NOTES:

1. Motion sensors are not a required item for low energy doors operators, but it is a prudent device when fragile or elderly pedestrian traffic in typical, such as a nursing home or hospital.
  2. Typical low energy doors are actuated by a "Knowing Act", i.e. a push plate.
- C. Each swing door must have installed a motion sensor to detect any person standing in the door swing path and prevent the door from opening.
  - D. Motion sensors consist of detection modules, factory prepared to be attached to each side of the lock/strike stile, an armored flex link power cable and bracket assembly, factory prepared for attachment to the pivot stile; a logic board and a position encoder mounted to the operator. The detection modules contain transmitting and receiving diodes and sense multidimensional zones for detection of people and/or objects in the door area. Provide detection modules that are high impact, shock resistant zinc castings with tinted lenses. The swing door sensor system must provide complete operating and safety zone coverage; fully adjust these zones to meet specific jobsite conditions (sidewalls, adjacent panels, etc.) The system cannot be affected by ultrasonic, ambient light or radios frequencies within the vicinity of the swing door.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Coordinate installation of equipment with other related work. Provide recessed or semi-flush mounted manual controls and power-disconnect switches in partitions. Secure operator components to adjacent construction with suitable fastenings. Conceal conduits, piping, and electric equipment in finish work.
- B. Install power units in locations shown. Where units are to be mounted on walls, provide metal supports or shelves for the units. All equipment, including time delay switches, must be accessible for maintenance and adjustment.

- C. Adjust operators to function properly for the type of traffic (pedestrians) expected to pass through doors. Each door leaf of pairs of doors must open and close in synchronization. On pairs of doors, operators allow either door to be opened manually without the other door opening.

## SPEC WRITER NOTES:

1. Push plate height location is debatable and can vary by state or city; anywhere from 36" to 48" AFF. It should however be located in compliance with ADA; visibly located within 60" (on the swing side) and such that the user is not standing in the swing path when pressed.
- D. Install controls at positions shown and make them convenient for particular traffic expected to pass through openings. Maximum height of push plate wall switches from finished floors to be 40 inches unless otherwise approved by the // RE/COR // Project Manager //.

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