



Conforms to UL STD 325  
Control No. 3011624



US Patent No.  
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## brookfield industries, inc. NB-500-LE Low Energy Powered Operator

### Description:

The brookfield **NB-500-LE** Swinging Door Operator has been designed, tested and is manufactured by **brookfield industries, inc.** for use on heavy commercial/industrial swing doors weighing up to 2,500 lbs and 48" wide. The **NB-500-LE** can be expected to safely operate doors at the maximum weight for at least 500,000 cycles, providing none of the rated values are exceeded.

We are Authorized to Mark the **NB-500-LE** with the **ETL** and **CE** markings from Intertek Testing Services to assure compliance with UL 325, FCC Part 15 (Emissions) and the following International Standards: EN 60335-1 and -2 (Safety), EN 61000-6-2 (Immunity) and EN 61000-6-4 (Emissions). The **Listing Report** refers to use on heavy commercial/industrial doors: such as blast resistant doors, security doors, heavy architectural doors or any door subjected to wind loads or a pressure differential.

The **NB-500-LE** is enclosed in the same housing as the standard NB-500 Door Operator; thus, the same installation drawings are used for the Low Energy version.

This **NB-500-LE Low Energy Powered Operator** is designed to receive an actuation signal to open the door from (2) possible sources of a "Knowing Act":

- 1) **Push-N-Go.** By pushing on the door, the operator senses movement, becomes energized, and opens the door. The amount of door movement prior to being energized is fully adjustable.
- 2) By providing a normally open, momentary (dry contact) input per this manual.

Under normal operation, this operator will automatically close the door after the preset Hold Open Delay (HOD) has been reached. On fire rated doors, it is recommended the door operator be connected to a UPS system in order to assure closing during power interruptions.

Interface with the PLC is provided with a hand held user-friendly operator panel to adjust door position presets (purchased separately).

### Rating a Door Operator:

The rating of any door operator in a particular application cannot be based solely on the weight and width of the door. Other factors such as an "out-of plum" frame, "hinge bind", hinge friction, acceleration and deceleration rates or pressure differential from one side of the door to the other, may have a substantial affect on the total operating torque it takes to move the door at ANSI speeds. For Example, a 500 lb door would be well within the weight limitations; however, if any of the other factors are not properly controlled, the total operating torque could exceed the rated values. In the design and testing of the NB-500-LE door operator, we have factored these variables into the Rated Operating Torque. This assures the customer they are getting the most durable product for their application.

Maximum Rated Operating Torque = 1,000 lb-in (113 N-m)

Maximum Rated Door Weight = 2,500 lb (1135 kg)

Maximum Rated Door Width = 48 in (1.22m)

*The NB-500-LE can be expected to operate any swing door within the rated values for at least 500,000 cycles, provided the door is operating within the ANSI 156.19 force and energy requirements.*

### Specification:

- 1) **Forward and reverse torque adjustment:** via current limit trimpot settings on the motor control to adjust the operating torque in order to comply with the 15 lb opening/closing force in ANSI 156.19.
- 2) **Automatic egress:** or door reversal whenever the force values of ANSI 156.19 have been exceeded in either the opening or closing directions; however, door shall not reverse automatically when in the latch check or back check modes.

- 3) **Auto backlash removal:** closes the door against the frame and removes all mechanical backlash in the system when in the latch check mode.
- 4) **Absolute position feedback control:** this assures the CPU always knows the door's position. During installation, a power interruption, or if electrical noise is encountered, the door is not required to be "homed", "reset" nor go through a "learn speed cycle" at any time.
- 5) **Manual operation:** 30 lbs to set door in motion; 15 lbs to full open, 1" from latch edge per ANSI 156.19
- 6) **Supply voltage:** 115VAC +/- 10% (230VAC for European service) 50/60 Hertz single phase. In-Line circuit breakers supplied with motor control and PLC. Surge protection, line filters, and EMI ferrites shall be included.
- 7) **Current Consumption:** maximum 3 amperes.
- 8) **PLC/Logic Control:**
  - a) Shall be a PLC with sufficient I/O and a CPU (Central Processing Unit) with adequate memory, response times and scanning rates in order to properly control the motion and positioning of linear accelerator swing doors.
  - b) Outputs commands shall be the internal type, integral with the PLC. No external limit switches shall be allowed for control of door positioning.
  - c) A means to interface with the PLC for adjusting preset values for the open, partial open, closed, latch check and back check positions.
  - d) Diagnostics and troubleshooting of the PLC shall be provided with LED and modular plug-in components.
  - e) The PLC shall be provided with an internal battery to store the door position presets in the CPU memory.
- 9) **Gear Motor:** 1/8 hp permanent magnet 90 volt DC motor 1650 RPM TENV, 40:1 reduction
- 10) **Motor Control:** shall be a full-wave, four quadrant, regenerative, 90 VDC variable speed control with the following functions and modified for optimum torque control for **Low Energy** applications:

FWD/REV maximum speed	FWD/REV current limit	IR compensation
FWD/REV acceleration/deceleration	1% speed regulation	50:1 speed range.
- 11) **Speed Control:** a means of controlling independent forward and reverse speeds per ANSI 156.19 as well as controlling latch check and back check speeds. This can be accomplished externally with speed pots or internally with the PLC.
- 12) **Drive train and linkage mechanism:** shall be designed to allow manual operation of the door per ANSI 156.19 in addition to assuring each component from the motor to the door attachment point is properly "sized" in order to transfer all working loads and operating torques. Standard linkage shall consist of a pull open design with crank arm, slider block and cam follower assembly.
- 13) **Enclosure:** 1/8" Aluminum plate reinforced with angle iron. Overall 8 3/4" high x 7 3/4" deep x 36 1/4" long. (2) 7/8" diameter penetrations for 1/2" conduit are drilled on each end or the metric equivalent for European installations.
- 14) **Materials:** Aluminum 6061-T651&T-6, AISI 1018 cold rolled steel, grade 5 bolting or better.
- 15) **Mounting hardware:** the NB-500 shall be mounted with (6) 3/8" grade 5 diameter bolts with compatible washers and lock washers. Hardware must also be properly tightened with adequate thread engagement.
- 16) **Finish:** all exposed carbon steel surfaces shall be prime painted, while all exposed aluminum surfaces shall be brushed and anodized.
- 17) **Functionality test:** each NB-500 is cycle tested in position for 24 hrs. prior to shipment. Each unit is checked for leaks and that all I/O are functioning properly.
- 18) **Installation:** the NB-500 shall be installed per drawing NB-500-4 for pull open linkages and NB-500-44. Optional: NB-500-0 for push open applications.