740158

Benchmark III

LCN®

Swing Operator
Models 9130, 9140 & 9150

Installation Instructions

Table of Contents

General

The Benchmark is an automatic electromechanical swinging door operator for use on hinged, center pivoted and offset pivoted doors. When activated, the Benchmark drives the door to full open position, then electrical power is turned off and the door is closed by spring force. The activating circuit opens the door from any position in the closing swing. During a power failure, the Benchmark acts as a manual door closer (Size 3). Door opening and closing cycles, including opening speed, back check speed, hold open time delay, closing speed, and latch position, are adjustable.

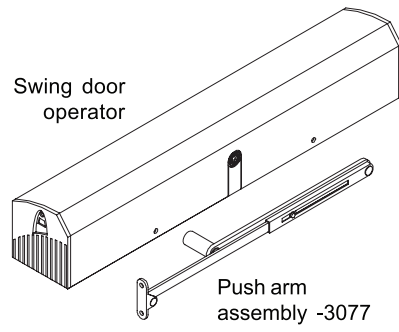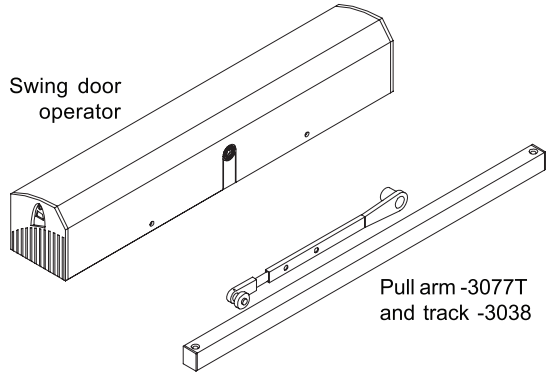| ⚠ **Warning** ⚠	⚠ **Caution** ⚠
always disconnect main power to the operator prior to servicing or cleaning.	**this operator is for indoor use only.** **Do not mount any accessories directly to the operator.**

Replacement Parts & System Components

Part	27" Header	Full Length Header Single	Full Length Header Double
Premium Control Box	9130-3462SC 9140-3462SC	9130-3462SC 9140-3462SC	9150-3462SC
Gear Box	9130-3454S 9140-3554S	9130-3454 9140-3454	9150-3454S
End Caps	9130-334	9140-334	9150-334

Part	Pull	Standard Push	Extended reveal Push	Finish
Arm Assembly	9130-3077T	9140-3077 9150-3077	9140-3077L 9150-3077L	US28 DC13

Double Push System
(Screw pack not shown)
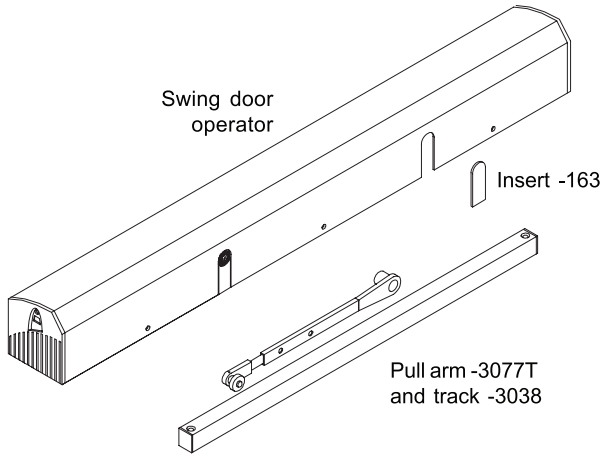
Swing door
operator

Pull arm -3077T
and track -3038

27" Pull System
(screw pack not shown)

Swing door
operator

Push arm
assembly -3077

27" Push System
(screw pack not shown)

Swing door
operator

Insert -163

Pull arm -3077T
and track -3038

Full Length Pull System
(screw pack not shown)

Swing door
operator

Insert
-163

Push arm
assembly -3077

Full Length Push System
(screw pack not shown)

Swing door
operator

Push arm
assembly -3077

Push arm
assembly -3077
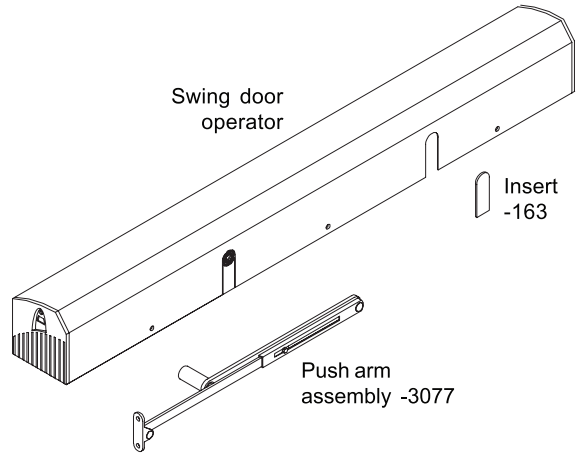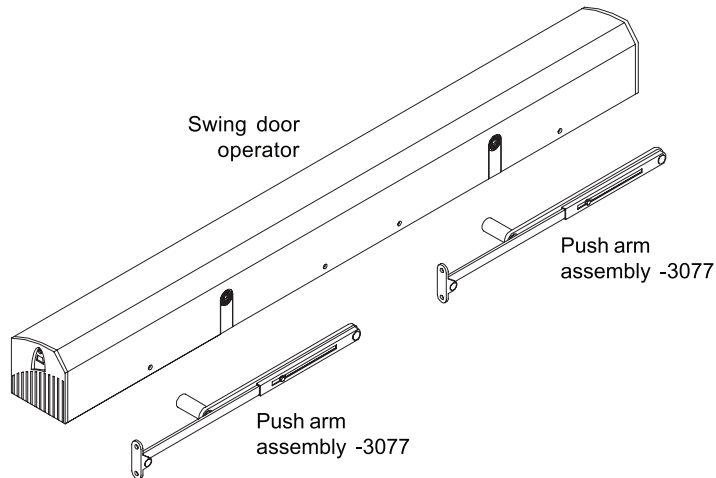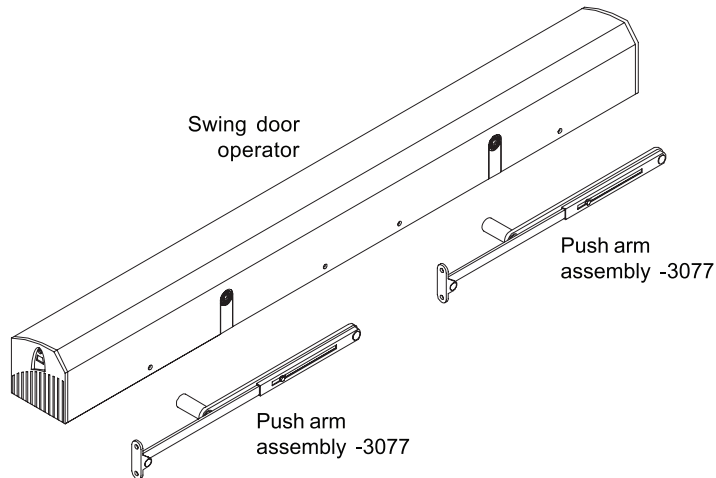
1	Pre-Installation Site & Product Check

1a	Check that the Product Model is correct for the required application.

1b	Check that all parts listed on the Bill of Material are in the shipping container.

1c	Check the architectural drawings and final approved shop drawings for the position of frame and structural openings.

1d Check header and frame dimensions and required clearances.

Clearances for 27" Pull System and Full Length Pull System

4-3/4"
Ceiling
3-5/32"
4-1/2"
5-5/8" minimum
1-5/8"
5/8"

2" frame face minimum
2" top rail in door minimum

Clearances for 27" Push System, Full Length Push System, and Double Push System

4-3/4"
Ceiling
3-5/32"
4-1/2"
5-9/16" minimum
1-3/16"
1-7/16"
0-6" reveal
15" maximum

2" frame face minimum
2" top rail in door minimum
5-1/4" top rail in door minimum (flush mount)

1e Check Door Width:
  a. 26" minimum for 27" Push Operator
  b. 30" minimum for 27" Pull Operator
  c. 36" minimum for Full Length Push or Full Length Pull Operators

1f	Check that Door Weight is 200 lbs. or less. For heavier door, consult factory.

1g Check that a 115 volt, single phase, 60 Hz, fused 15 amp, 3-wire power supply is available at the side jamb with approximately 12" of wire available to connect to the Operator. UL approved flexible conduit is recommended for the 115 volt power line.

The 115 volt power supply must be a dedicated circuit from the main circuit breaker panel and must NOT be connected into any building lighting system that operates flourescent lights.
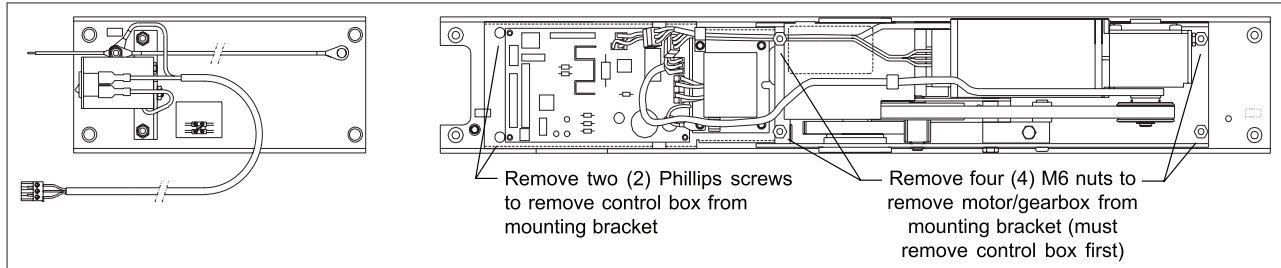
2 Operator Installation

2a Remove Control Box from Operator Mounting Bracket, then remove Motor/Gearbox from Bracket:

Control Box and Motor/gearbox removal
27" Pull, 27" Push, and Double Push Systems

Remove four (4) M6 nuts to remove motor/gearbox from mounting bracket (must remove control box first)

Remove two (2) Phillips screws to remove control box from mounting bracket
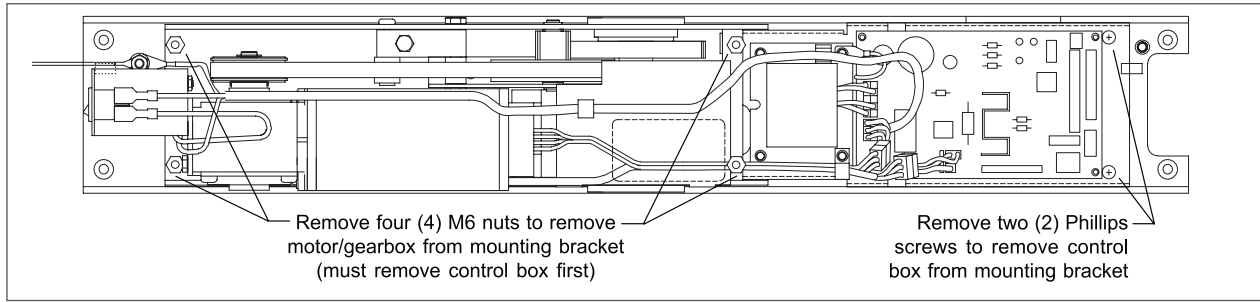
Control Box and Motor/gearbox removal
Full Length Pull and Full Length Push Systems

Remove two (2) Phillips screws to remove control box from mounting bracket

Remove four (4) M6 nuts to remove motor/gearbox from mounting bracket (must remove control box first)

2b Prepare Header/Frame and Door:

> ### notE
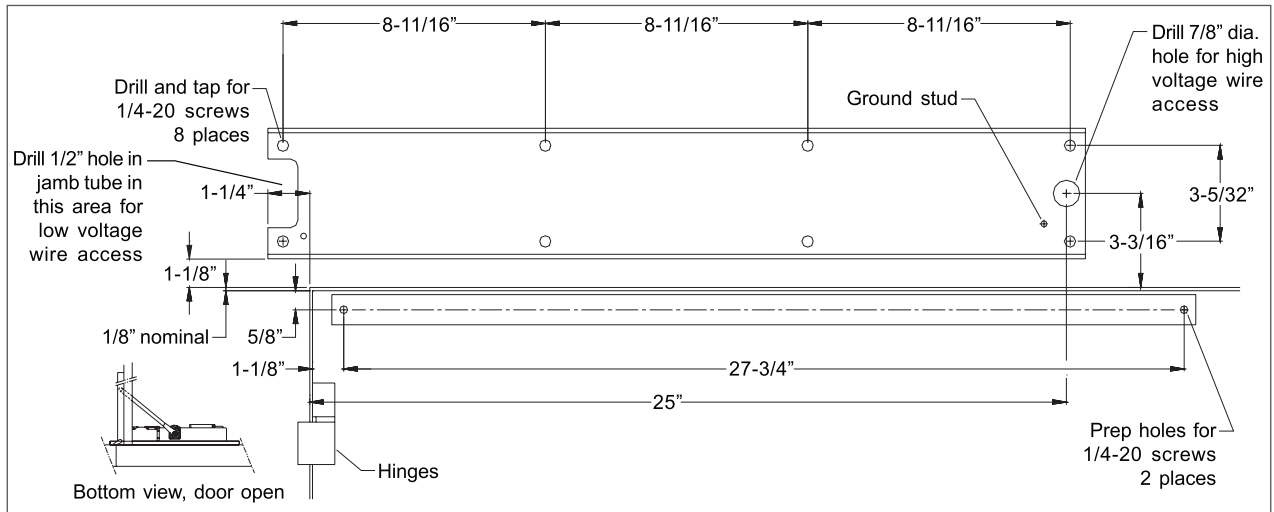> **For Push units with a reveal greater than 6" refer to the installation sheet included in the Extended arm package.**

2c Install Operator Mounting Bracket on Header/Frame. For Full Length systems, also install Switch Bracket on Header/Frame.

2d Install Motor/Gearbox on Operator Mounting Bracket. Then install Control Box on Bracket.
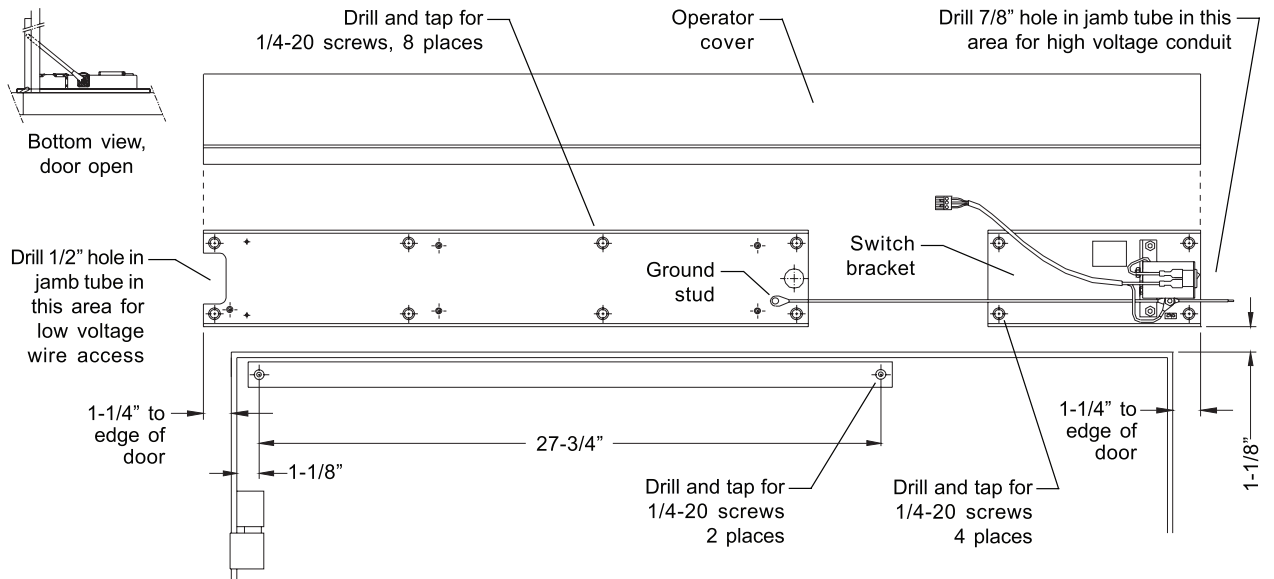

2e Proceed to Chapter 3: Wiring (Page 9).

27" Pull System
Header/Frame and Door Preparation

8-11/16"   8-11/16"   8-11/16"

Drill 7/8" dia. hole for high voltage wire access

Ground stud

Drill and tap for 1/4-20 screws 8 places

Drill 1/2" hole in jamb tube in this area for low voltage wire access

1-1/4"

3-5/32"

3-3/16"

1-1/8"

1/8" nominal

5/8"

1-1/8"

27-3/4"

25"

Prep holes for 1/4-20 screws 2 places
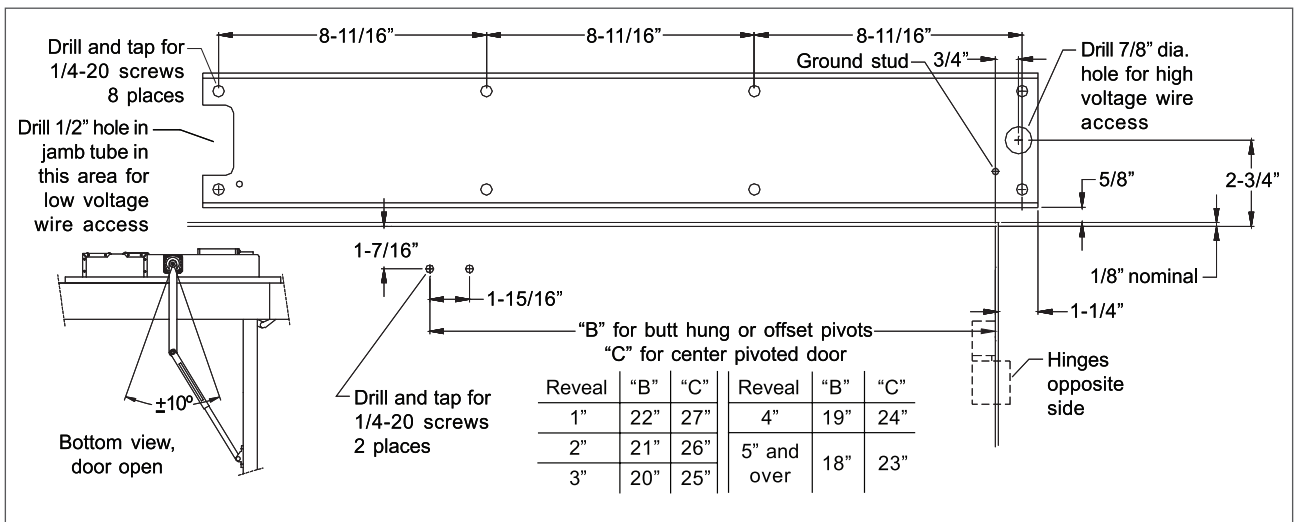
Hinges

Bottom view, door open

Full Length Pull System
Header/Frame and Door Preparation

Center Operator Cover (with End Caps removed) over opening and mark a vertical line at each end. Align ends of Operator Mounting Bracket and Switch Bracket with vertical lines and adjust vertical position per diagram below. Mark and prepare mounting holes.

Drill and tap for 1/4-20 screws, 8 places

Operator cover

Drill 7/8" hole in jamb tube in this area for high voltage conduit

Bottom view, door open

Drill 1/2" hole in jamb tube in this area for low voltage wire access

Ground stud

Switch bracket

1-1/4" to edge of door

1-1/8"

27-3/4"

Drill and tap for 1/4-20 screws 2 places

Drill and tap for 1/4-20 screws 4 places

1-1/4" to edge of door

1-1/8"

27" Push System
Header/Frame and Door Preparation

8-11/16"   8-11/16"   8-11/16"

Drill and tap for 1/4-20 screws 8 places

Drill 1/2" hole in jamb tube in this area for low voltage wire access

Ground stud   3/4"

Drill 7/8" dia. hole for high voltage wire access

5/8"

2-3/4"

1/8" nominal

1-1/4"

1-7/16"

1-15/16"

±10°

Bottom view, door open

Drill and tap for 1/4-20 screws 2 places

Hinges opposite side

"B" for butt hung or offset pivots
"C" for center pivoted door

Reveal	"B"	"C"	Reveal	"B"	"C"
1"	22"	27"	4"	19"	24"
2"	21"	26"	5" and over	18"	23"
3"	20"	25"			

5

Full Length Push System
Frame/Header and Door Preparation

Center operator cover (with end caps removed) over opening and mark a vertical line at each end. Align ends of operator mounting bracket and switch bracket with vertical lines and adjust vertical position per diagram below. Mark and prepare mounting holes.
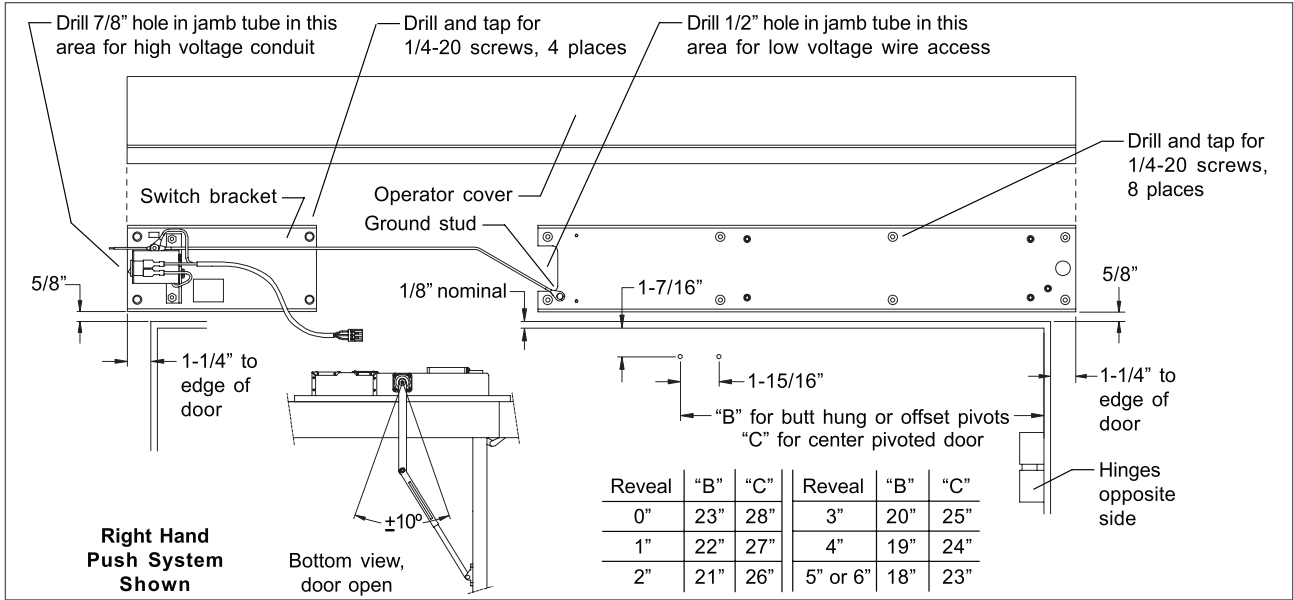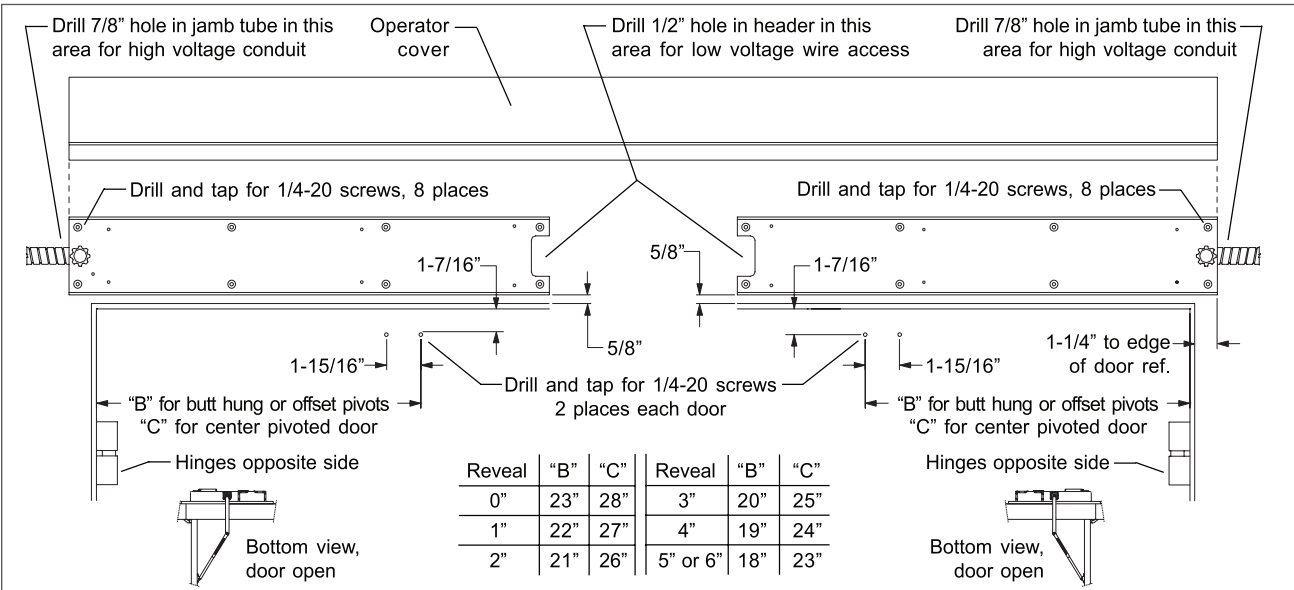
Drill 7/8" hole in jamb tube in this area for high voltage conduit

Drill and tap for 1/4-20 screws, 4 places

Drill 1/2" hole in jamb tube in this area for low voltage wire access

Drill and tap for 1/4-20 screws, 8 places

Switch bracket

Operator cover

Ground stud

5/8"

1/8" nominal

1-7/16"

5/8"

1-1/4" to edge of door

1-1/4" to edge of door

1-15/16"

"B" for butt hung or offset pivots
"C" for center pivoted door

Hinges opposite side

Right Hand Push System Shown

±10°

Bottom view, door open

Reveal	"B"	"C"	Reveal	"B"	"C"
0"	23"	28"	3"	20"	25"
1"	22"	27"	4"	19"	24"
2"	21"	26"	5" or 6"	18"	23"

Double Push System
Header/Frame and Door Preparation

Center operator cover (with End Caps removed) over opening and mark a vertical line at each end. Align ends of Operator Mounting Bracket and Switch Bracket with vertical lines and adjust vertical position per diagram below. Mark and prepare mounting holes.

Drill 7/8" hole in jamb tube in this area for high voltage conduit

Operator cover

Drill 1/2" hole in header in this area for low voltage wire access

Drill 7/8" hole in jamb tube in this area for high voltage conduit

Drill and tap for 1/4-20 screws, 8 places

Drill and tap for 1/4-20 screws, 8 places

1-7/16"

5/8"

1-7/16"

5/8"

1-15/16"

Drill and tap for 1/4-20 screws 2 places each door

1-15/16"

1-1/4" to edge of door ref.

"B" for butt hung or offset pivots
"C" for center pivoted door

Hinges opposite side

Bottom view, door open

"B" for butt hung or offset pivots
"C" for center pivoted door

Hinges opposite side

Bottom view, door open

Reveal	"B"	"C"	Reveal	"B"	"C"
0"	23"	28"	3"	20"	25"
1"	22"	27"	4"	19"	24"
2"	21"	26"	5" or 6"	18"	23"

6

Low Ceiling application (27" Push System only)
Header/Frame and Door Preparation

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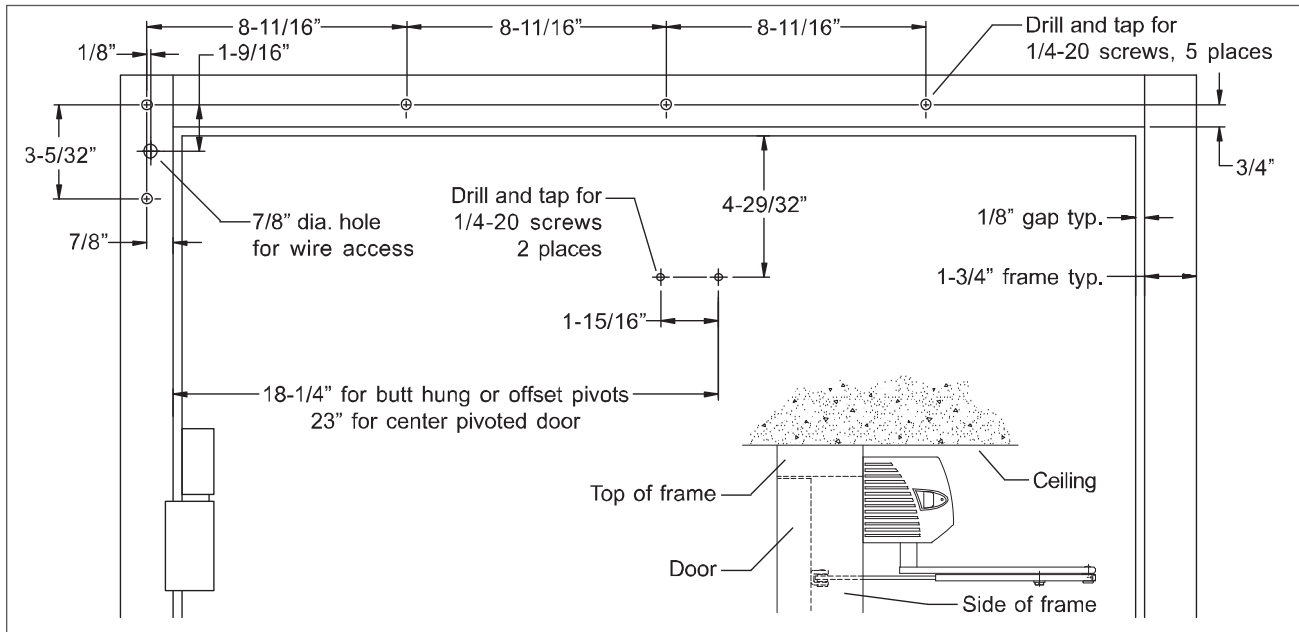
3   Wiring

Caution

Make sure all wires are properly dressed and secured to prevent interference.

route all wiring away from moving parts, sharp edges, and heat sources.

use copper conductors only.

Do not modify the factory wiring or connect into existing electrical circuits or devices.

3a   Refer to the appropriate wiring diagram for the Control Box (Page 19) or the diagram supplied for custom applications. Connect the following cables:
- Ground Cable (Ground the Operator properly with the earth from main supply)
- Hall Effect Cable (Do not wrap the Hall Effect Cable around the Motor Power Cable)
- Motor Power Cable (Do not wrap the Motor Power Cable around the Hall Effect Cable)
- Control Box Power Cable

3b   Connect Activate, Safety, Key Switch, and lock accessories, as needed.

Refer to the accessory instructions for any accessories used. Do not connect any remote activating device to the door unless it is located within line of sight of the door.

3c   When wiring is complete, proceed to Chapter 4: Arm and Cover Installation (page 10).

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4   Arm & Cover Installation

Caution

Keep hands, clothing, wires, tools, etc., aWaY FroM operator Motor when the operator Motor is turned on.


4a   Make sure the Operator Powers is turned Off.

4b   Install a jumper across the control box Main Act and Main Act.

4c   Turn the operator power switch to On.

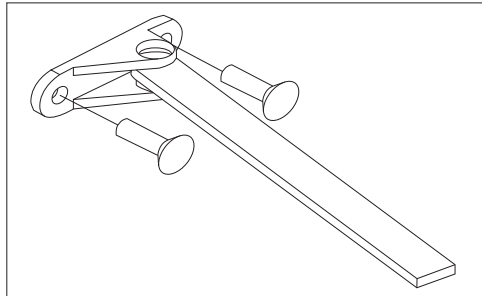The operator motor will activate and drive to the Full Open position.

4d   Attach the arm to the operator spindle loosely with the 8mm socket head screw.

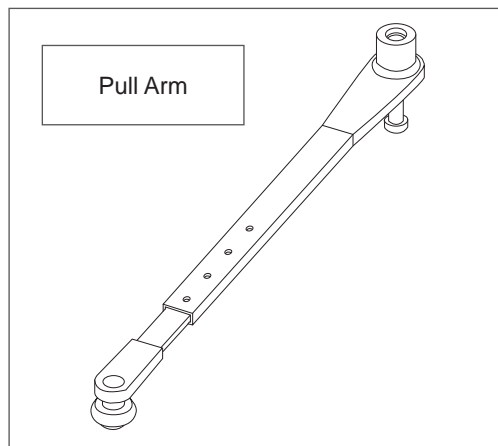For push systems, ensure that the adjusting boss is inserted correctly.
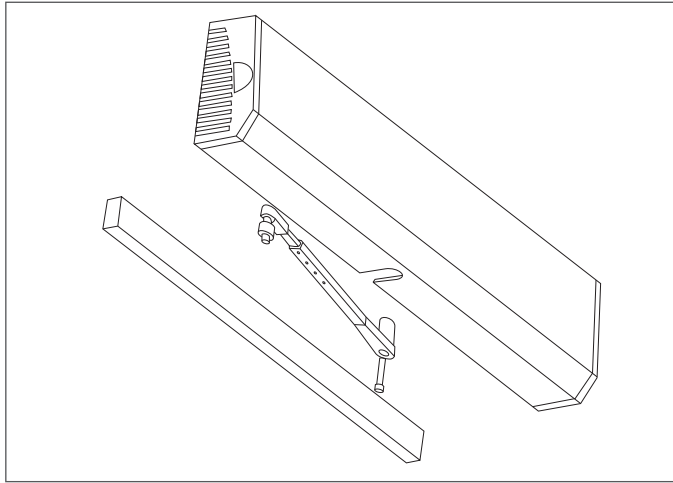
4e   Attach the arm to the door.
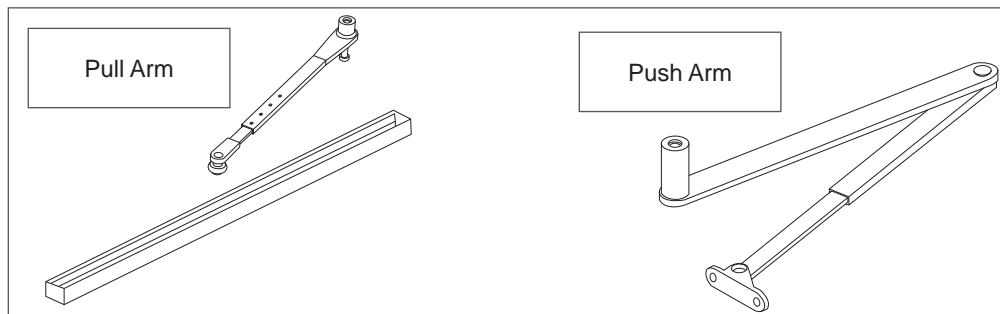1. For push systems, attach the push arm shoe to the door:

2. For pull systems, slide the pull arm roller into the track, then insert a track cap on each end of the track and attach the track to the door:

Pull Arm

4f   Adjust arm:
1. For pull systems, remove the locking screw from the arm.
2. For push system, remove the locking screw from the arm.

Pull Arm

Push Arm

3. Keep the door in the full open position and adjust the arm length as necessary to align the door at 90 degrees from closed. When the arm is adjusted to the correct length, tighten the 8mm socket head screw that secures the arm to the operator spindle.
4. Ensure this screw is secure, then tighten the arm locking screw.

4g	Turn Off the power operator switch. The door should close.
4h	Remove the jumper from the control box Main Act and Main Act.
4i	Test the operator (see Chapter 5: Operational Check on page 13).
4j	Adjust the operator as required (see Chapter 6: Operator Adjustment on page 15).
4k	Snap the optional end cap insert (in bag of screws) into end cap opposite the On/Off switch.
4l	Install the cover assembly onto the operator.
4m	Release the operator for service (see Chapter7: Release for Service on page 17).

5   Operational Check

5a   Set the key switch to Auto (if used) and turn on the operator power switch.

5b   Activate the operator using the activation device.

The operator will perform one sizing cycle.

Sizing cycle: Occurs after power is turned on and a legitimate activation signal is received. During the sizing cycle, the door opens and closes one time.

5c   If the Door does NOT OPEN AT ALL during the sizing cycle:
- Check the door for binding.
- If an electromechanical lock is being used, check that the lock disengages before the operator opens the door.
- Check fuses, circuit breakers and connections.
- Adjust the operator and check the door operation (see Chapter 6: Operator Adjustment on page 15).

Below are default settings:

    Opening Speed 9:00
    Back Check Speed 3:00
    Hold Open Time Delay 10:00
    Latch Position 12:00
    Closing Speed... 12:00
    SW1 1, 2, 3, 4 .... OFF
    Back Check Position .... 4:00 (fully clockwise)

5d   If the door does NOT OPEN FULLY during the sizing cycle:
- Check the door for binding.
- Increase the back check speed slightly and re-check the door operation. Repeat until door opens fully.

5e   If the door SLAMS OPEN during the sizing cycle, decrease the back check speed slightly and re-check the door operation. Repeat until the door opens without slamming.

5f   After the sizing cycle is completed and the door(s) are closed, apply a maintained activation signal. Check that the door remains open while the signal is applied.

5g   If a door safety device is being used:
1. Door Open Safety:
   When the door is in the closed position, activate the safety device and try to activate the door open. The door should remain closed.
2. Door Close Safety:
   When the door is in fully open position, activate the safety device and the door should remain open.

5h   When the door is operating properly, continue with step 4j above.

See table below and diagrams (page 16) for operator feature adjustment.
After adjusting, cycle the door several times to check for proper operation. Then continue with step 4k on page 9.

notE
adjust operator for the SLoWESt operation practical, in accordance with the latest revisions of the americans with Disabilities act (aDa); anSi/BHMa a156.19 Standards for Power-assisted and Low Energy Power-operated Doors; and local codes.

opening Speed: 5 seconds or more   **Latch Location: 10 degrees or more**
Closing Speed: 3 seconds or more   **Latch Speed: 1.5 seconds or more**

Features	Control	Description	Counter Clockwise	Clockwise
Opening Speed	Opening Speed	Controls opening speed of door	Slower	Faster
Back Check Speed	Back Check Speed	Controls the speed of the door near the full open position to prevent door slamming	Slower	Faster
Hold Open Time Delay	Hold Open Time Delay	Controls the length of time the door remains in the full open position: 1 sec to 15 sec	Less Time Down to 1 sec	More Time Up to 15 sec
Back Check Position	Back Check Position	Door position where back check speed engages	Less Latch	More Latch
Closing Speed	Closing Speed	Controls closing speed of door	Slower	Faster
Delayed Activation	DLY (SW1)	Delays opening of door for strike applications (1 second delay)		
Push and Go	PNG (SW2)	ON: Pushing the door open 5° causes operator to open door for remainder of open cycle		
Power Boost On or Off	PB (SW3)	ON: 3-second power boost enabled: applies additional force to close door—used for high wind situations		
	SW4	Not used		
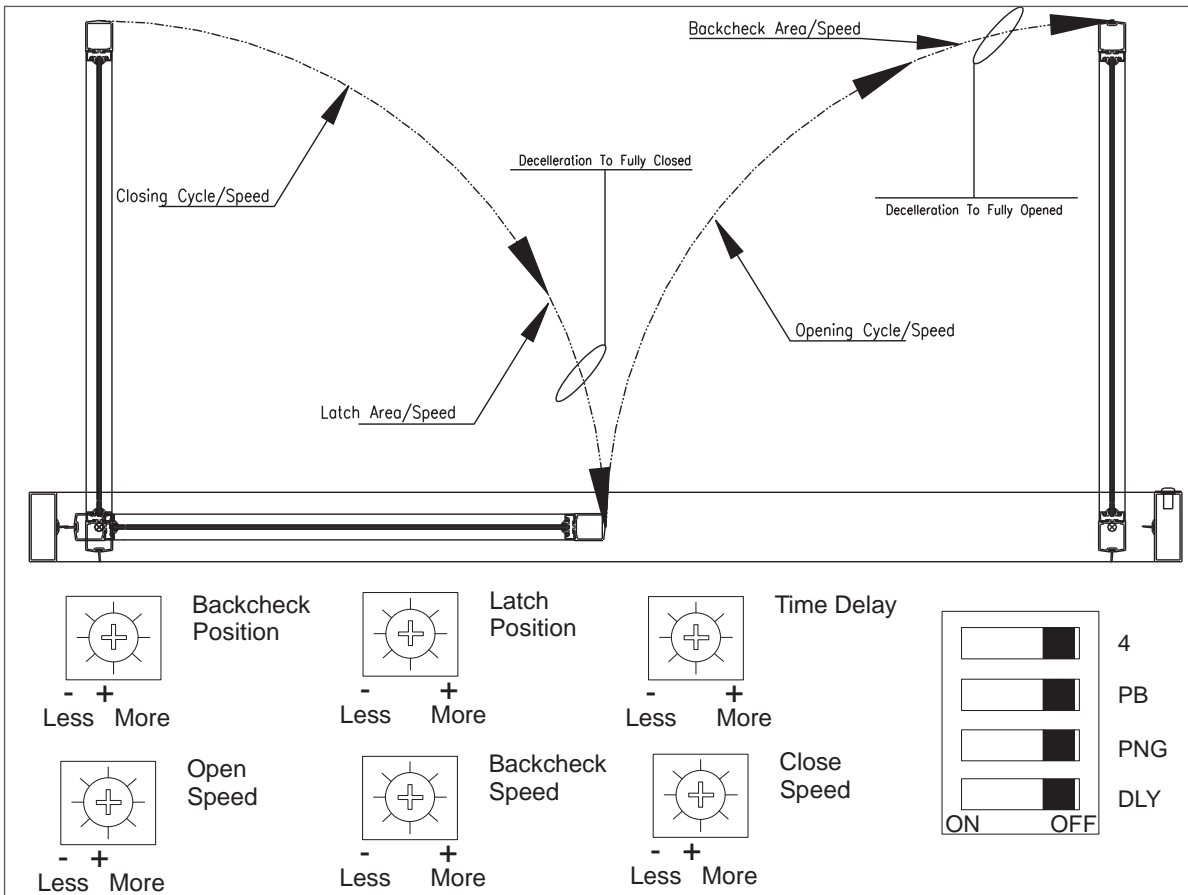
7	Release for Service

7a   Remove all tools, installation equipment and debris from the vicinity of the door.

7b   MANDATORY: Install all Safety, Traffic Control and Instruction Labels onto the door, as required. Failure to do this will leave the INSTALLER LIABLE for any accidents that occur.

7c   Give verbal instruction on how to properly operate the door to the owner or person in charge.

7d   Give verbal instruction to the owner or person in charge on periodic inspection of the door for the following:
- Occasional damage
- Developing problems
- Minor preventative maintenance

7e   Provide the owner or person in charge with a contact name and phone number to call for future service and maintenance.

> **iMPortant**
> **Be sure to install all Safety, Traffic Control and Instruction Labels onto the door, as required.**

8	Benchmark III Software

8a   Operation:
1. Sizing
   From start-up (Sizing), the door will activate via:
- 1-Way Input (Main Act and Main Act).
- 2-Way Input (3-Way OFF, 3-Way HO and 3-Way GND) with key switch in the ON position, uses either Main Act or Aux Act input
- Key switch in Hold Open position.

The first motion of the door will be towards the Door Open position. The speed during Sizing is automatic and cannot be set from a potentiometer.

The door drives to full open and the system sets the open counter to full open.

The door closes at Closing Speed. The system sets the closed counter to Full Closed when the latch goes up at the Closed position.

The system calculates all other parameters required for normal operation based on the two values of Full Open and Full Closed.
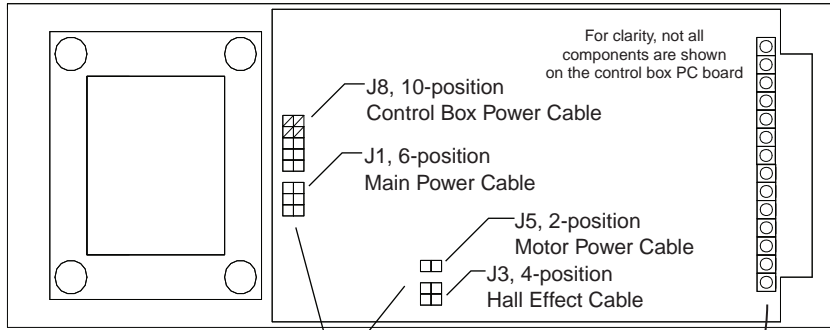2. Standard Operation

Upon a legitimate activation signal, the door accelerates to opening speed while monitoring the current load on the drive output. If the current exceeds the specified level, the door will stop and close.

The door travels at it's set speed (based on the potentiometer setting) until it reaches the Back Check position, where it will decelerate to the Back Check Speed.
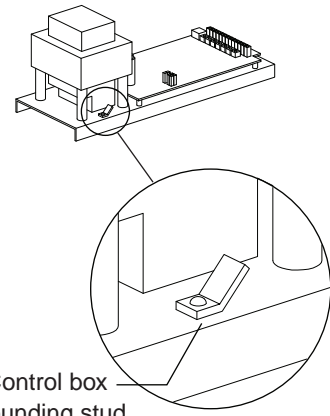
The door will stop at the Hold Open position and remain there until an activation or the Hold Open Timer is cleared.

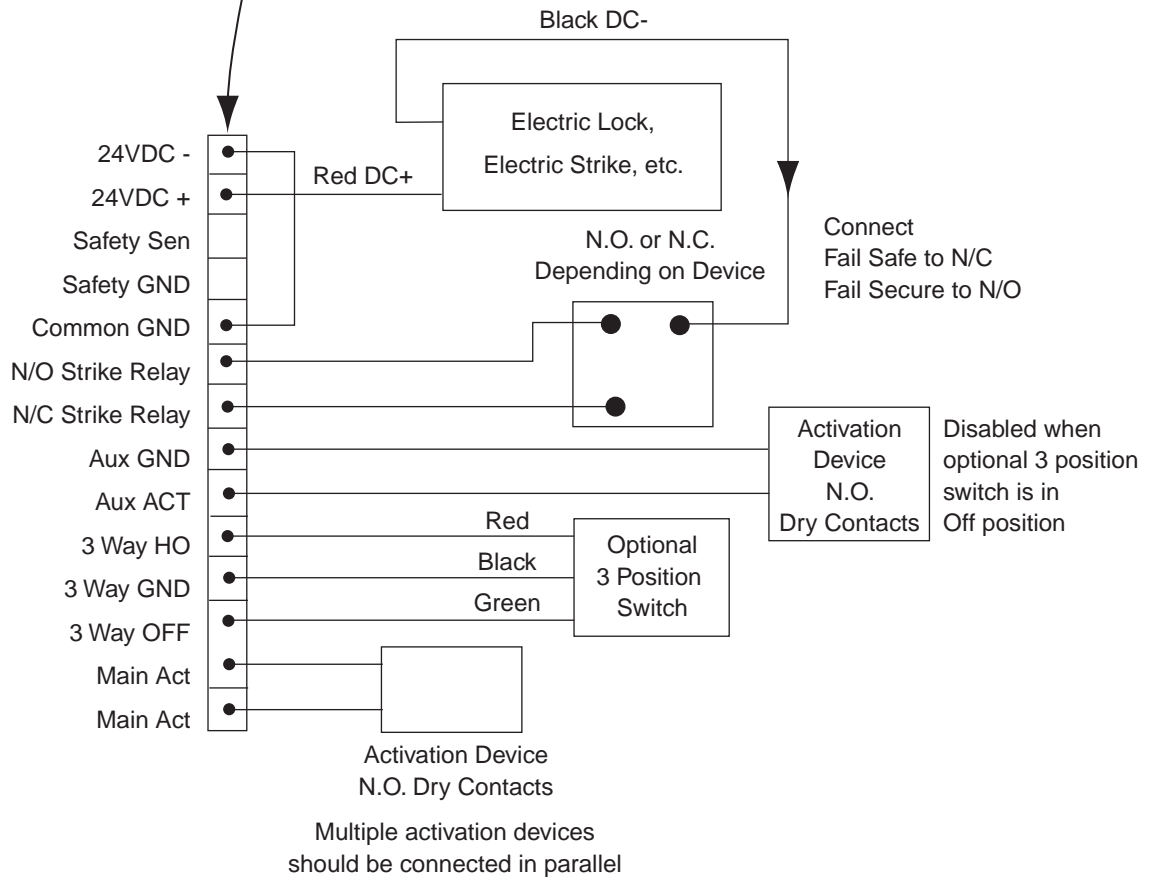The door then closes at its Closing Speed (based on the potentiometer setting) up to the latched position.

If the Closing Speed is decreased by driving the motor in the open direction (a fixed setting), power is added to allow the spring to continue closing the door to the Full Closed position.
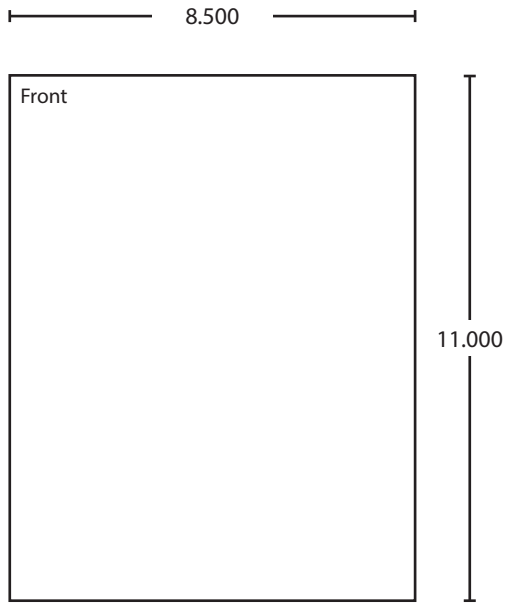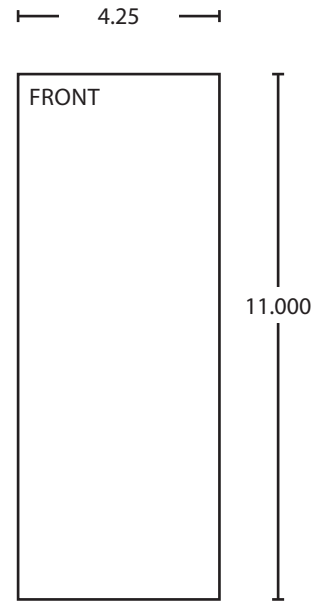
For clarity, not all components are shown on the control box PC board

J8, 10-position
Control Box Power Cable

J1, 6-position
Main Power Cable

J5, 2-position
Motor Power Cable

J3, 4-position
Hall Effect Cable

Plug cables into these receptacles

Control box grounding stud

Black DC-

Electric Lock,
Electric Strike, etc.

24VDC -

24VDC +   Red DC+

Safety Sen

Safety GND

Common GND

N/O Strike Relay

N/C Strike Relay

Aux GND

Aux ACT

3 Way HO   Red

3 Way GND   Black

3 Way OFF   Green

Main Act

Main Act

N.O. or N.C.
Depending on Device

Connect
Fail Safe to N/C
Fail Secure to N/O

Activation
Device
N.O.
Dry Contacts

Disabled when
optional 3 position
switch is in
Off position

Optional
3 Position
Switch

Activation Device
N.O. Dry Contacts

Multiple activation devices
should be connected in parallel

8.500

Front

11.000

BEGINNING SHEET

4.25

FRONT

11.000

FOLDED SHEET

Additional Notes:

1. None

	Revision History				
E	F	G	H	J	K
042801					

Revision Description:
E > New Release

Material

White Paper

Notes
1. printed two sides
2. printed black
3. tolerance ± .13
4. 12-page saddle-stitched booklet
5. drawings not to scale

Edited By	Approved By	EC Number	Release Date
D. Myers	M. Sasso	042801	01-01-14

Title

Benchmark III Swing Operator Installation Instructions

Creation Date 12-15-10	Number 740158	Revision E

Created By N/A	Activity 3899 Hancock Expwy Security, CO 80911	
Software: InDesign CS6		© Allegion 2014