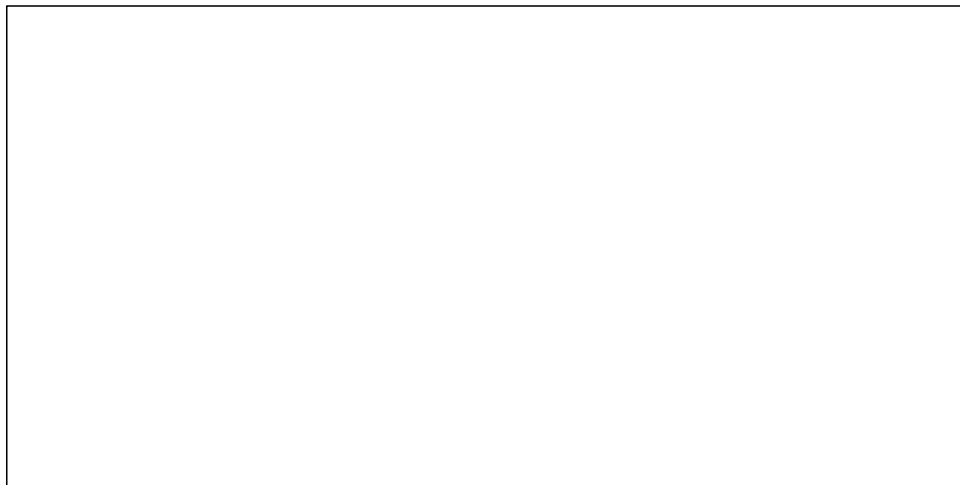


# AUTOMATIC SWING DOOR

## SURFACE APPLIED (SA)

### INSTALLATION INSTRUCTIONS

Distributed by:



### Important Installation Instructions

ALL INSTALLATIONS AND SERVICE SHOULD ONLY BE PERFORMED BY TRAINED OR AUTHORIZED PERSONS

Warning - To reduce the risk of injury or death:

1. Carefully Read And Follow All Installation Instructions
2. This unit should only be installed in a rough opening capable of providing proper structural support.
3. Always disconnect the power supply before servicing.
4. To install and adjust the door for proper and safe operation, the installer must carefully read and follow these instructions exactly.
5. The door is designed to be installed only by trained and knowledgeable installers. The installation technician should be experienced in the installation of automatic entrances. They should know all local code requirements and be familiar with the requirements of the current ANSI A156.10 & 156.19 Standards for Power Operated Pedestrian Doors.
6. After installation, the door must be adjusted to conform with DORMA recommendations and all code requirements. Carefully study the requirements in these instructions.
7. After installation and adjustment, the installers final responsibility is to properly instruct the owner in the safe use of the door. He must also present the owner with the ED400 Owner's Manual and carefully explain how to perform the daily safety check test.
8. Each step of the installation, adjustment and instructions are important for proper and safe use of the door being installed. If there are any questions about any items contained in these instructions, call the DORMA Technical Assistance Group for assistance.
9. Save these instructions for future reference.

### Compliance with Safety Standards

Your door system was designed to the latest operating and safety standards. In order to ensure the continued safe operation of your door, it is important that:

- Your door system be maintained in compliance with the standards of the industry, BHMA/ANSI 156.10 or 156.19.
- Proper decals and labels be applied, per BHMA/ANSI standards, and maintained on your doors. If decals are removed, or cannot be read, request labels to be replaced when calling for service.

**Tools Required:****Screwdrivers**

- Small Straight (Flat Blade) - for Terminal Block wiring
- #2 Phillips (Crosspoint) - for various #8, #10, and #14 screws

**Wrenches / Sockets**

- 7/16" - for #1/4-20 Hex Head bolts attaching header to jambs
- 9/16" - for adjustments of hardstops (2 wrenches needed)

**Allen Wrenches**

- 1/4" - for top and bottom pivot

**Electric Drill with the following drill bits -**

- 3/8" - for attaching rivenuts to jambs
- 9/64" (or #28) - for installing sensors
- 5/32" (or #22) - for installing #10 sheet metal screws into adjacent storefront & Bottom pivot
- 13/64" (or #7) - for installing #14 sheet metal screws into adjacent storefront
- 1/4" - for clearance holes in jambs

**Impact Drill with the following masonry bits -**

- 1/4" - for #10 screw anchors
- 5/16" - for #14 screw anchors

Level - suggested 4' minimum

Step Ladder - 4' or 6'

Tape Measure

Rubber mallet or Hammer - for arm attachment

Caulking and Application Gun

Electrical Wire Strippers /Cutters - for sensor wiring

**Suggested Fasteners Required - (Not supplied)****Jamb Attachment Screws -**

- #14 X 2-1/2" PHSMS (Pocket Jambs)
- #14 X 3" FHSMS (Tube Jambs)
- Optional Anchors for masonry

**Threshold Attachment Screws**

- #10 X 1-1/2" FHSMS
- Optional Anchors for masonry

**Header Attachment Screws**

- #14 X 1-1/2" HHSMS
- #14 Flat Washer

Construction Shims - for squaring door frame in opening

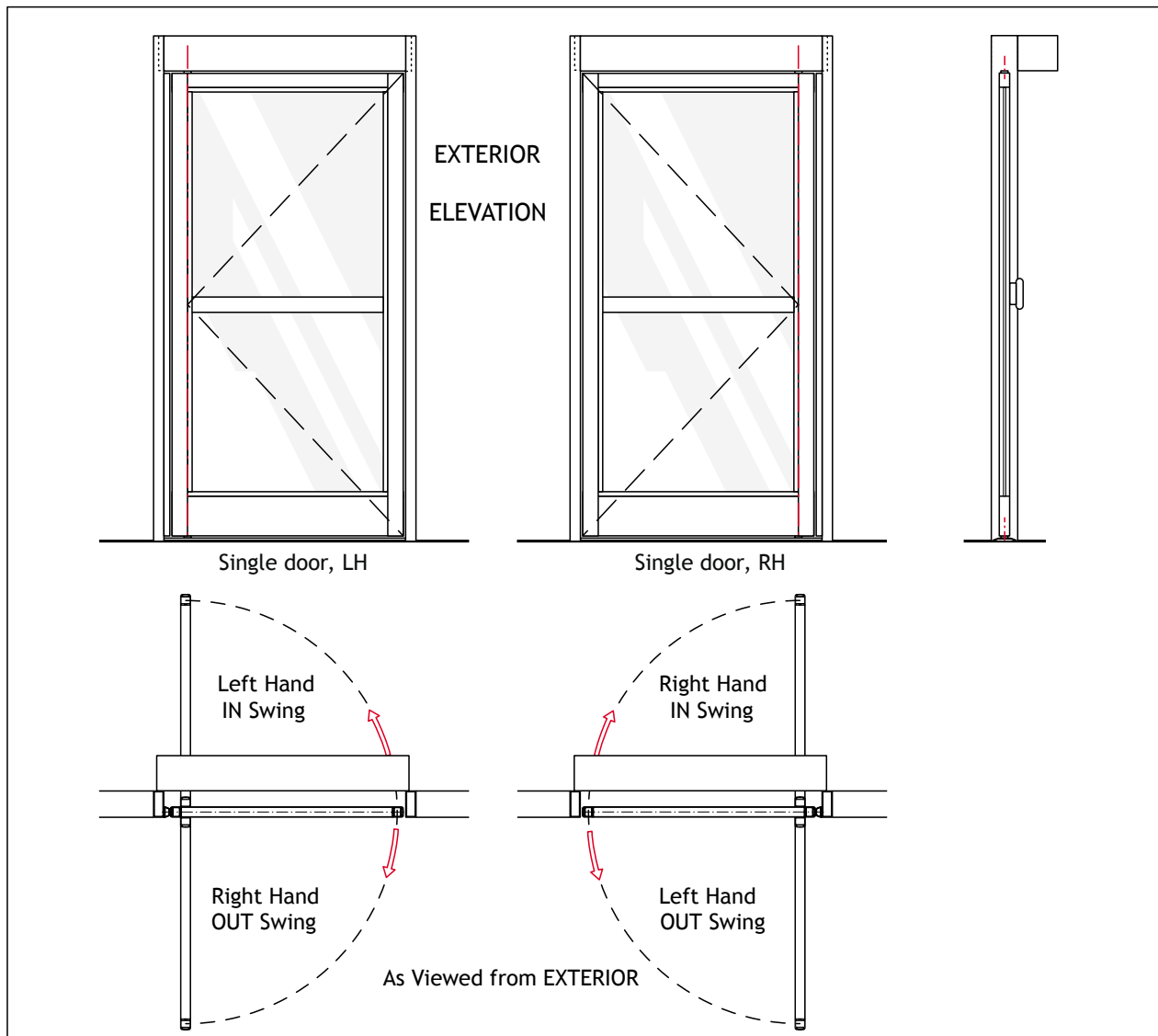
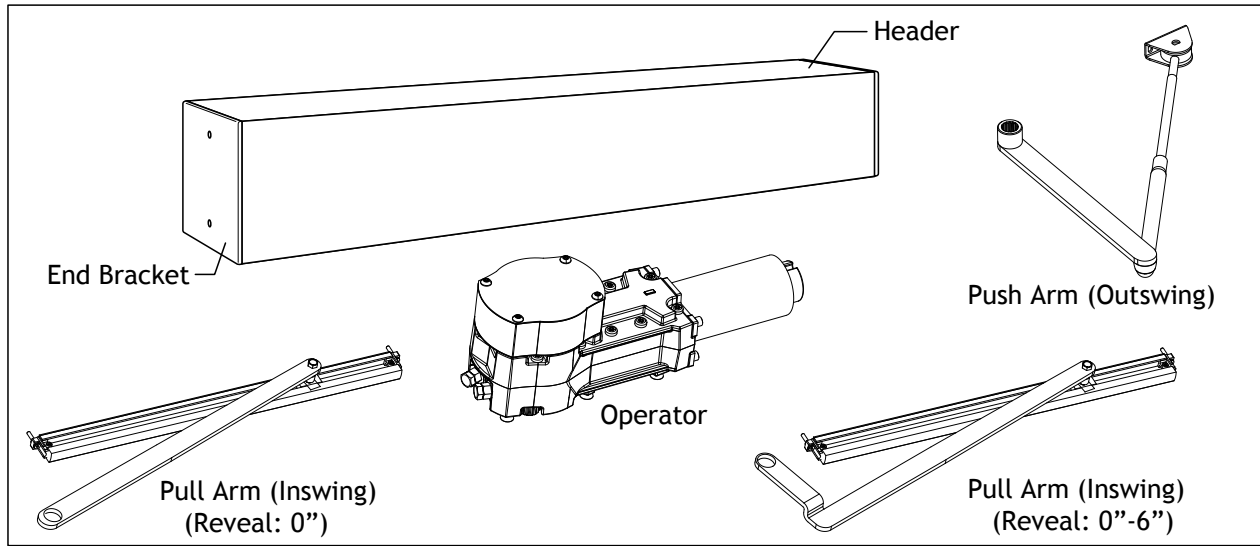
## Contents

### SA (Surface Applied)

Section A:	pg. 4-6	Mount the door frame, operator, and controller.
Section B:	pg. 7-10	Controller Connections and Install sensors.
Section C:	pg. 11	Power the Operator to Hardstop
Section D:	pg. 12-14	Mounting of Push Arm. Hardstop Adjustment. (optional)
Section E:	pg. 15-18	Mounting of Pull Arm. Hardstop Adjustment. (optional)
Section F:	pg. 19-20	Basic Set-Up
Section G:	pg. 21	Customize Set-Up
Section H:	pg. 22-23	Setting up Simultaneous Doors (side-by-side)
Section I:	pg. 23	Setting up Semi-Independent Doors (side-by-side)
Section J:	pg. 24	Magnetic Locks
Section K:	pg. 24	Final Check
Section L:	pg. 25-26	Technical Data

### Section A: Mount the operator

A



## Section A: Mount the operator

A

Place Header upon Jamb/Door Frame and install hardware (7/16" socket/wrench required).

#14 x 1-1/2" Hex Washer Head Sheet Metal Screw  
Recommend:  
2 per side into jamb &  
1 every 12" into frame

**1**

\*Door not shown for clarity

**Note:**  
Operator is shown on left side. For opposite mounting, contents of header are mirror-imaged.

Route wire for 120 Vac Power Supply. Attach to Grounding Screw (See Figures 7 and 11, on Pages 7 and 9).

Drill 3/4" Dia Hole Thru for 120 VAC wiring.

120 Vac  
15 Amp  
Service

Wire: AWG14 (Strand 41 x 30)  
3 Connector PVC Insulated Cable

Use strain relief provided

**2**

Place Operator into Header.

Slide operator standoffs back in slotted channels

right hand  
right hand

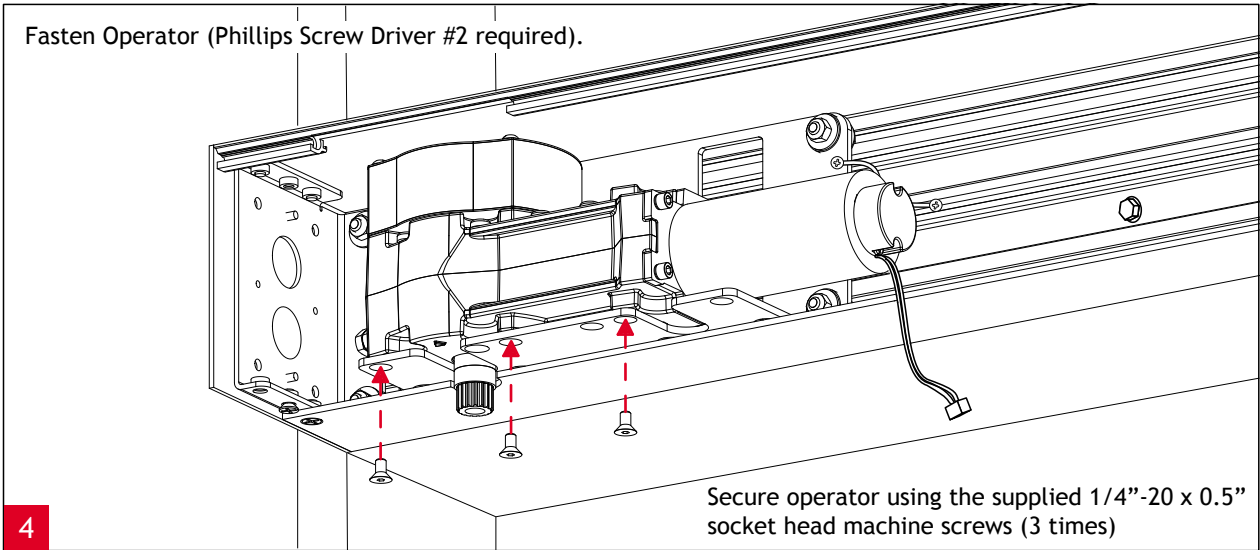
slots for left hand

**3**

## Section A: Mount the operator

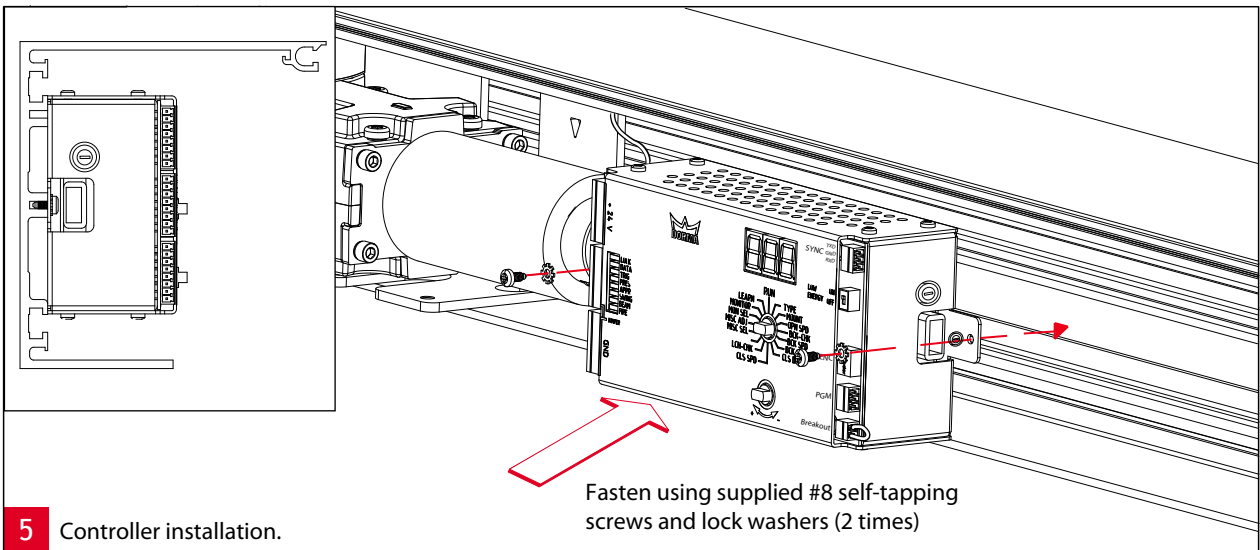
A

Fasten Operator (Phillips Screw Driver #2 required).



4

Secure operator using the supplied 1/4"-20 x 0.5" socket head machine screws (3 times)

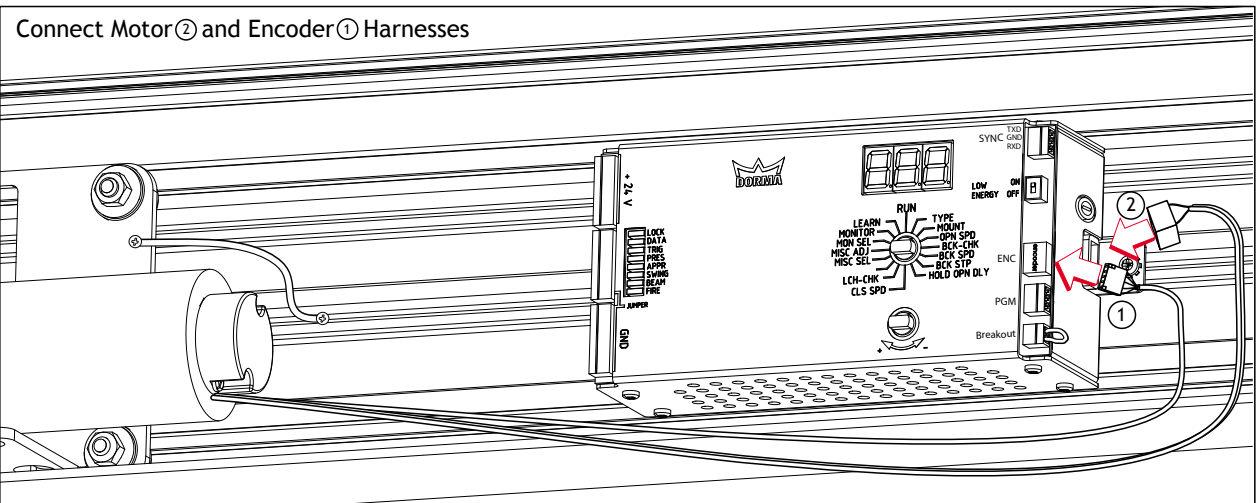


5

Controller installation.

Fasten using supplied #8 self-tapping screws and lock washers (2 times)

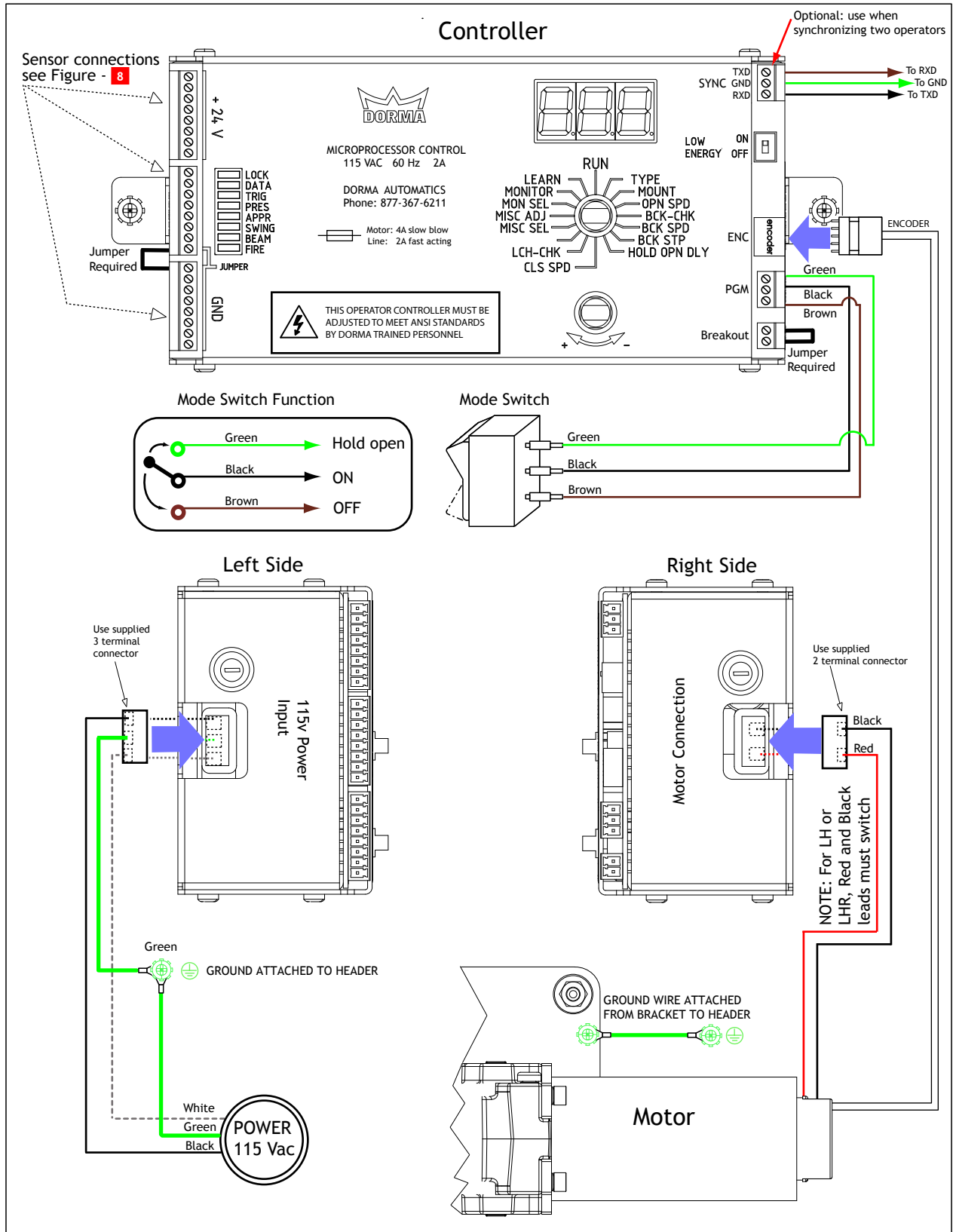
Connect Motor ② and Encoder ① Harnesses



6

**DO NOT PLUG MOTOR HARNESS INTO POWER, IT WILL DAMAGE MOTOR!**

# Section B: Connecting the Controller and Sensors



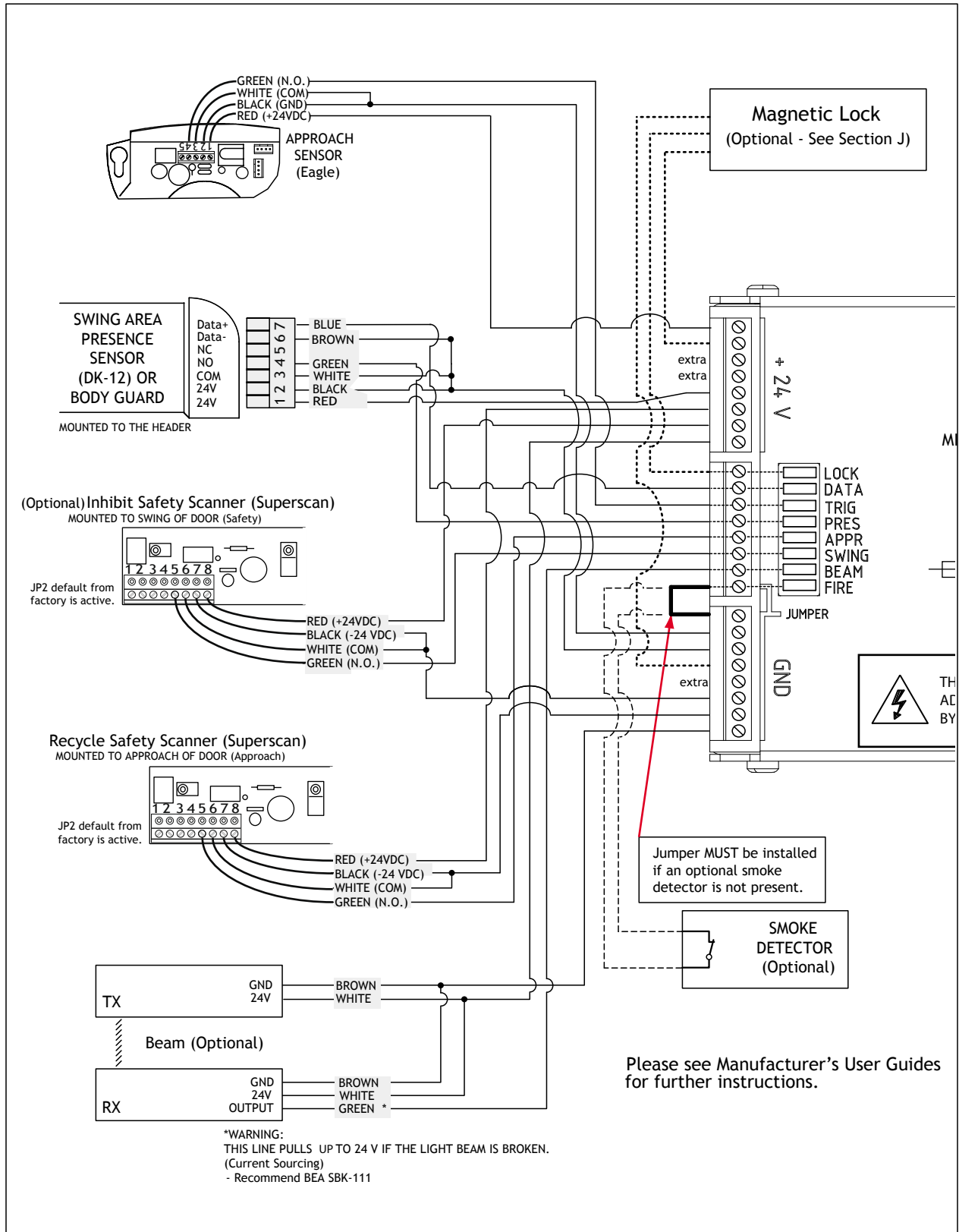
B

## 7 Connect Operator Internal Wiring to Control



### Section B: Connecting the Controller and Sensors (BEA)

B



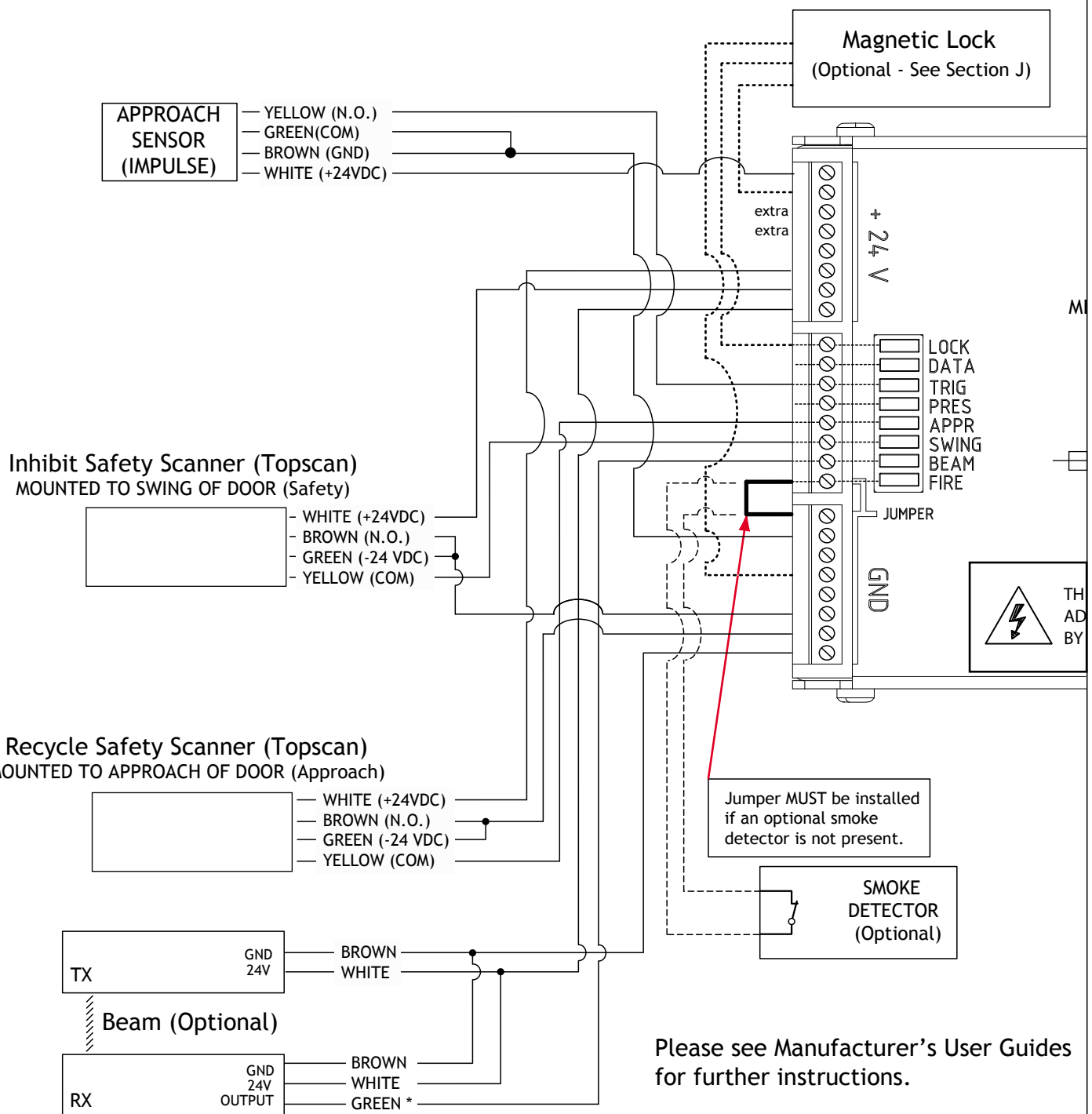
Jumper MUST be installed if an optional smoke detector is not present.

Please see Manufacturer's User Guides for further instructions.

8 Follow the installation and adjustment instructions accompanying the sensors to be installed. Insure compliance with BHMA/ANSI Standards.

## Section B: Connecting the Controller and Sensors (Bircher Reglomat)

**B**

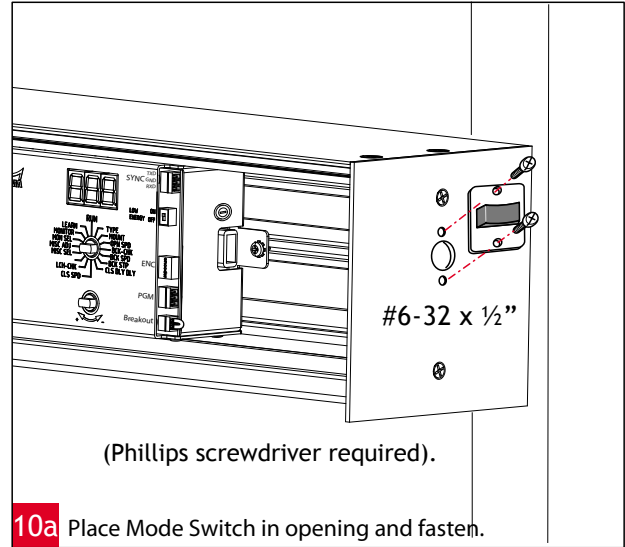
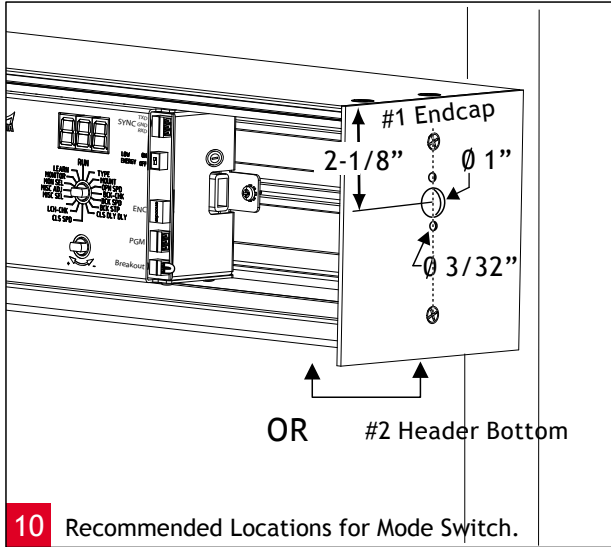


**\* WARNING:**  
THIS LINE PULLS TO 24 V IF THE LIGHT BEAM IS BROKEN. UP  
(Current Sourcing)  
- Recommend BEA SBK-111

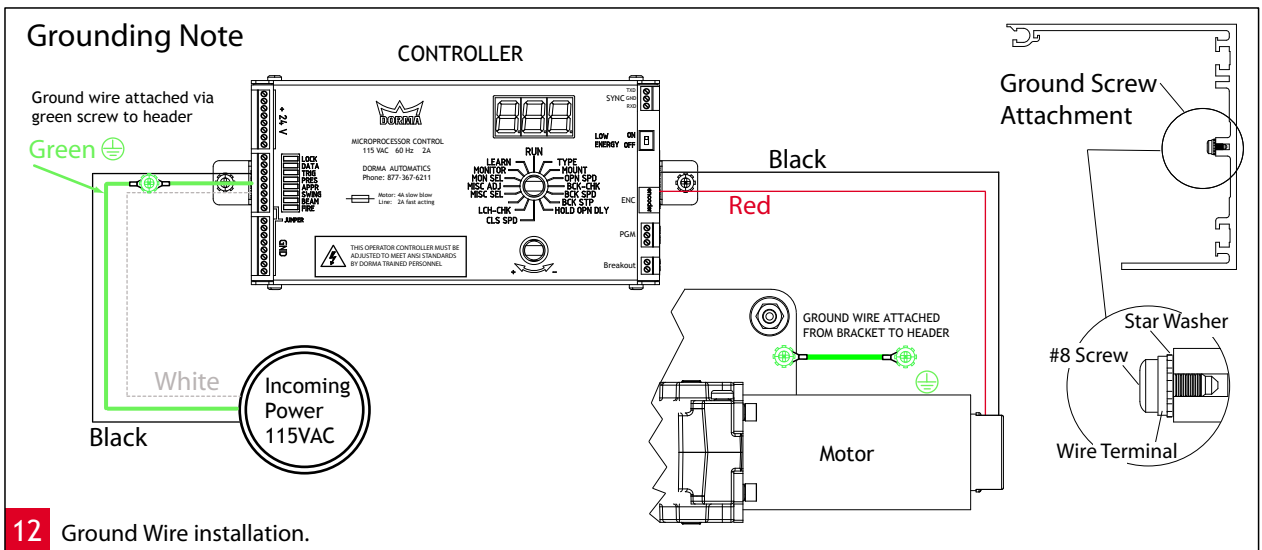
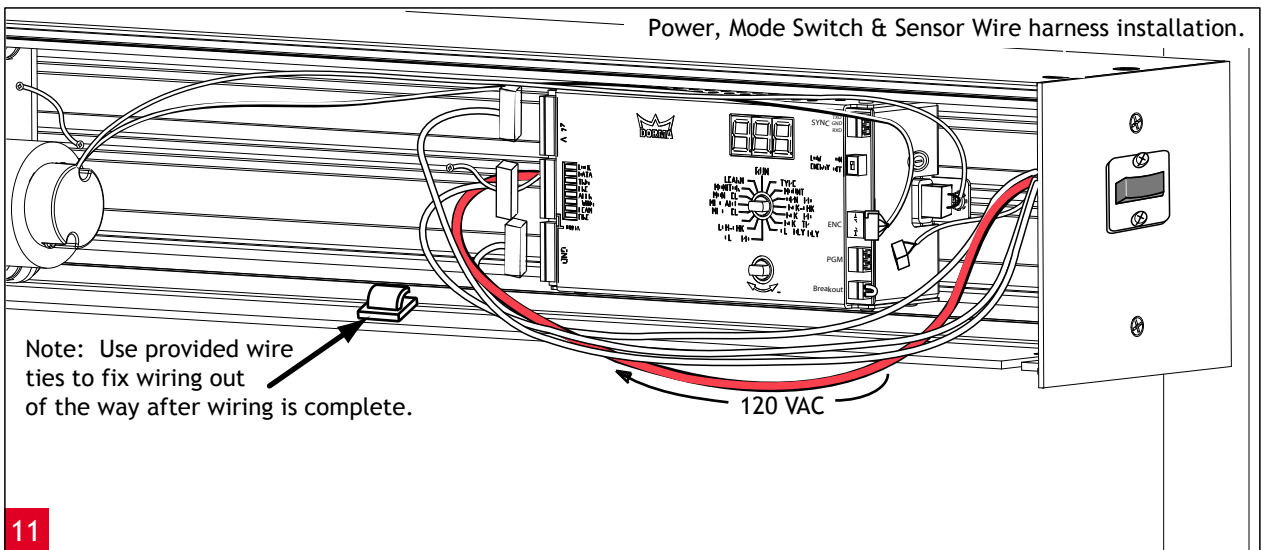
Please see Manufacturer's User Guides for further instructions.

Follow the installation and adjustment instructions accompanying the sensors to be installed. Insure compliance with BHMA/ANSI Standards.

## Section B: Connecting the Controller and Sensors



B



## Section C: Power the Operator to Hardstop

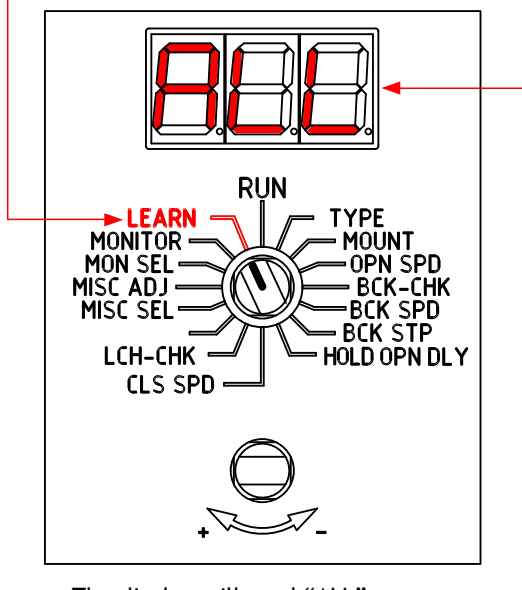
The purpose of this feature is to drive the operator to the fully-open hardstop. It is also used to load the operator spring during the installation.

### Basic Requirements

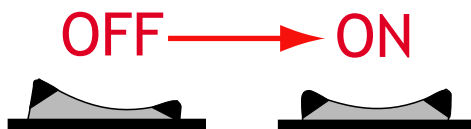
- All cables are connected.
- Swing area is clear of obstacles
- Mode switch in position "OFF".
- Controller must have "Low Energy Switch" in "OFF" position.
- Power connected.

### Start-Up

- Turn selector knob to "LEARN".



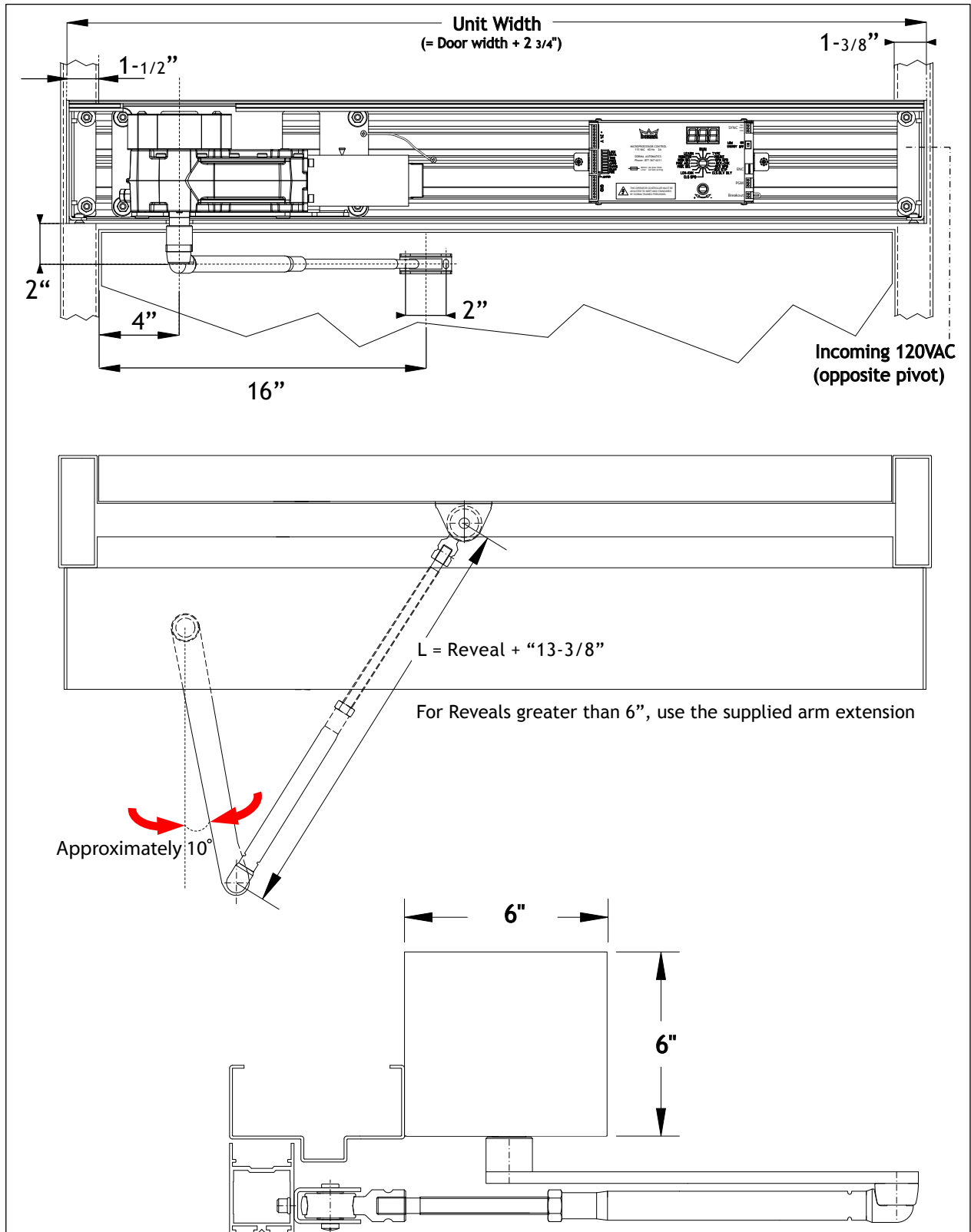
- The display will read "ALL".
- Turn mode switch from "OFF" to the "ON" position.



- The operator pinion will now begin turning slowly in the open direction, and stop indefinitely at the hardstop.
- Connect the arm to the operator pinion with the door opened to the desired fully open position.
- When installation procedure is complete, turn the mode switch to the "OFF" position to power down the operator and close the door.

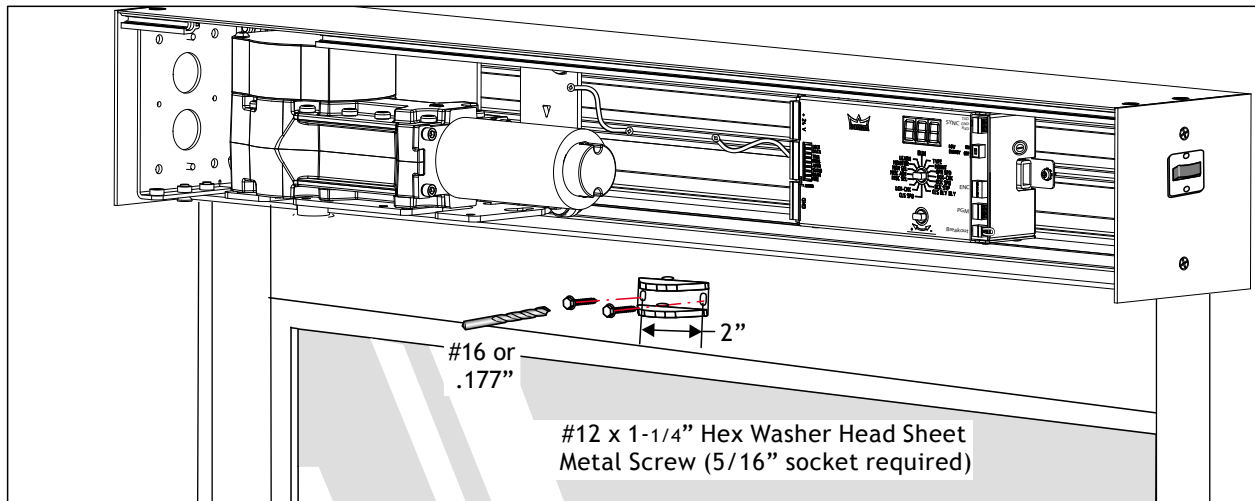
C

### Section D: Mount the Push Arm

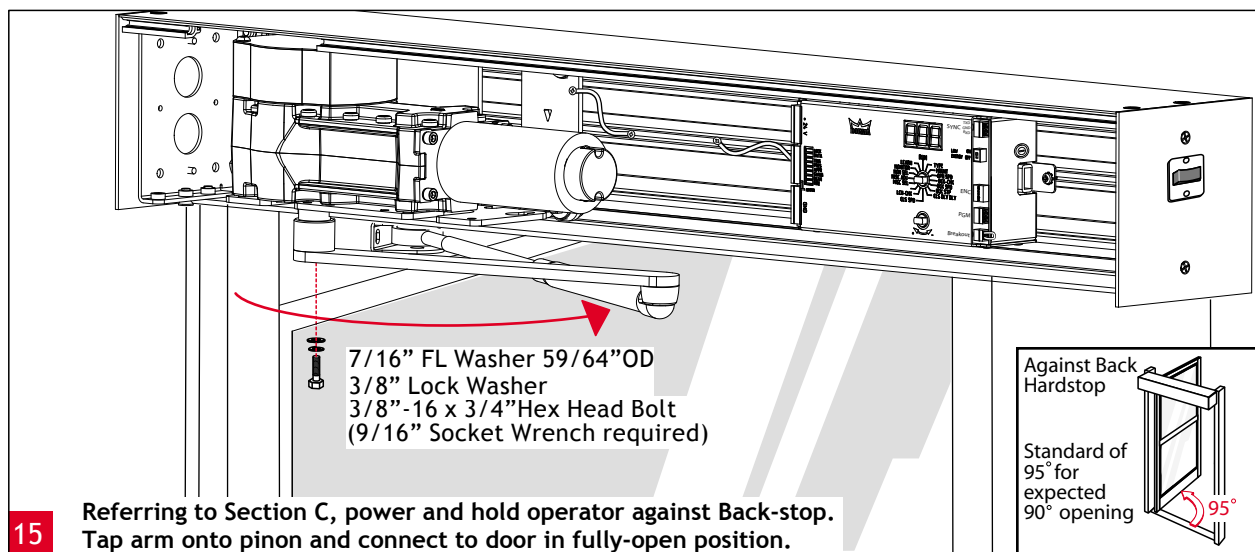


**13** Installation of Surface Applied - Push Application.

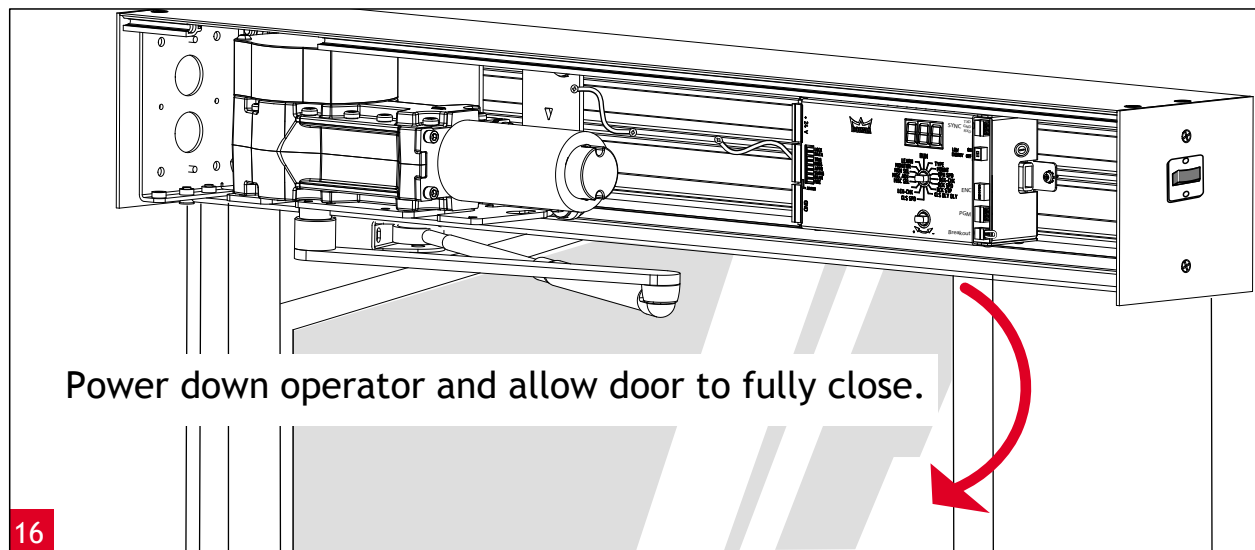
Section D: Mount the Push Arm



**14** Mount foot only on door (remove foot from arm assembly - 1 Ph Pn Hd screw- Phillips screwdriver required).

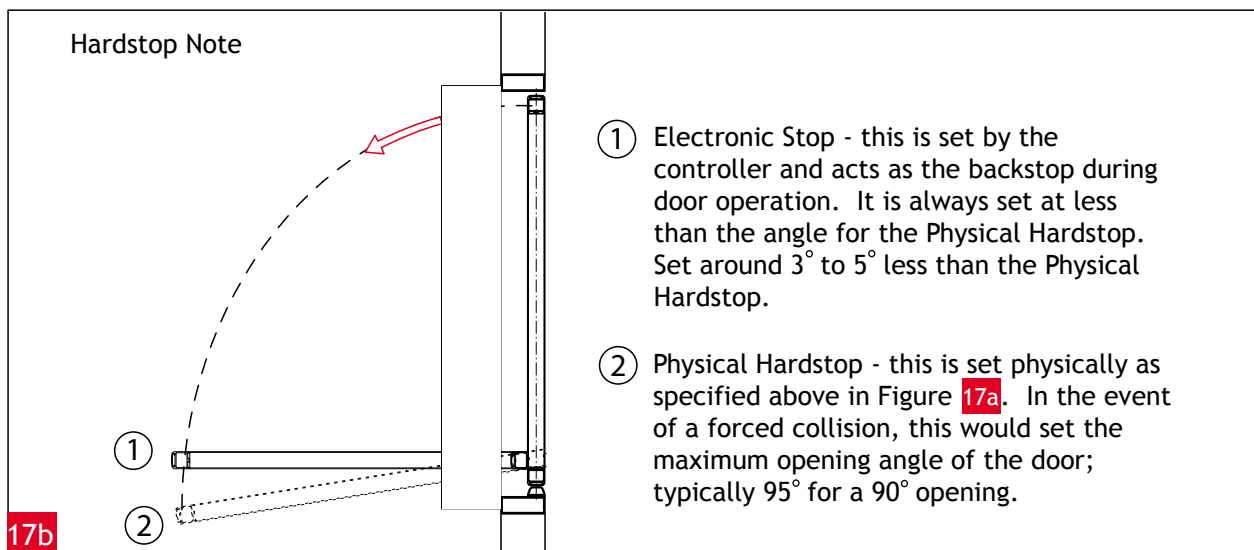
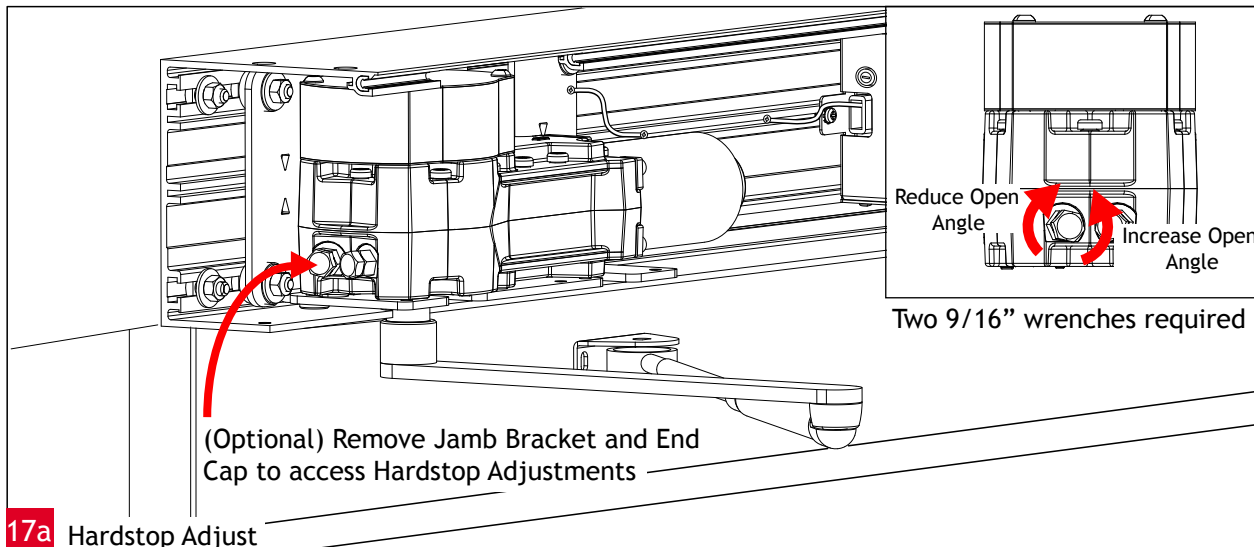


**15** Referring to Section C, power and hold operator against Back-stop. Tap arm onto pinon and connect to door in fully-open position.

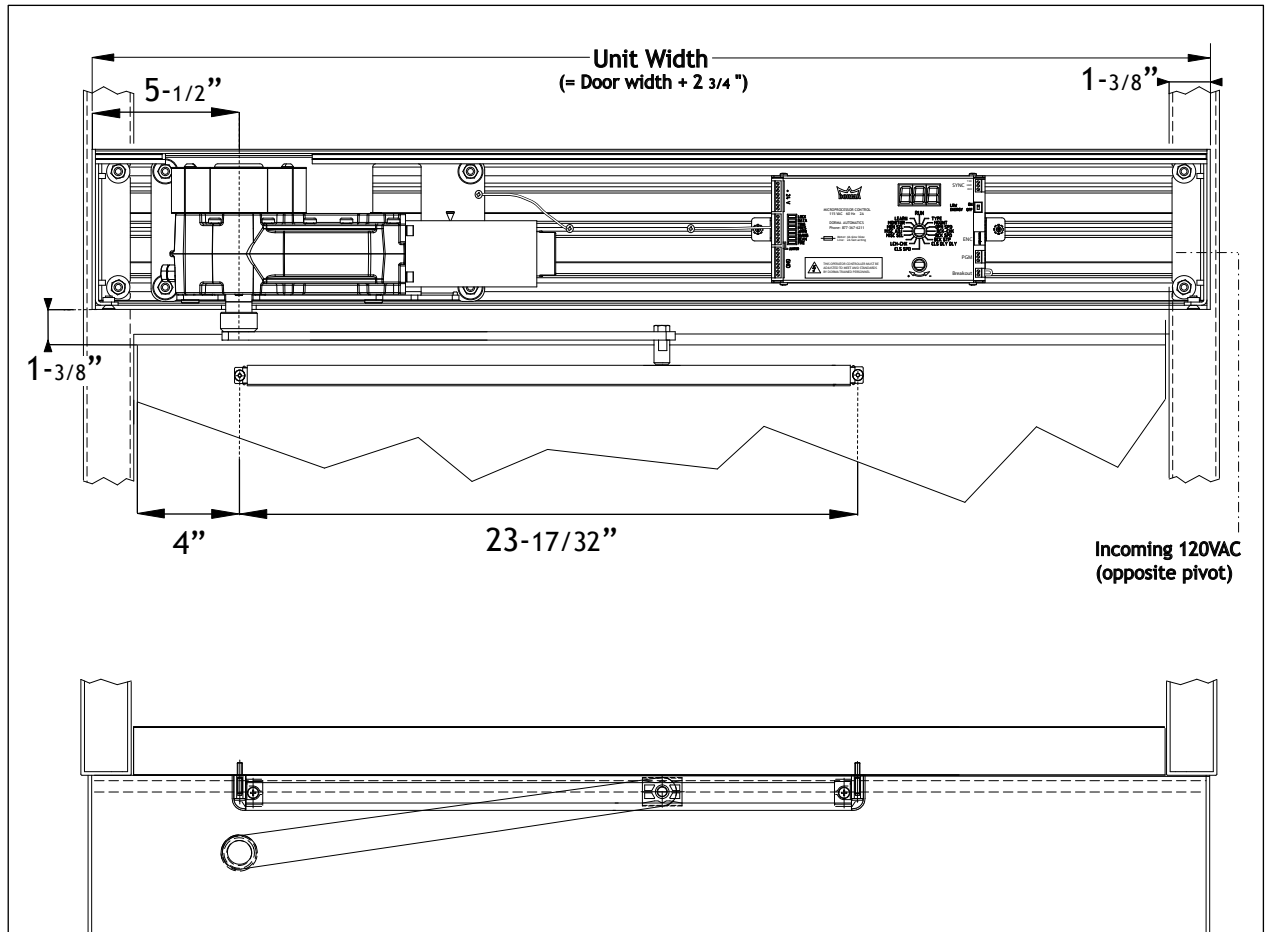


**16** Power down operator and allow door to fully close.

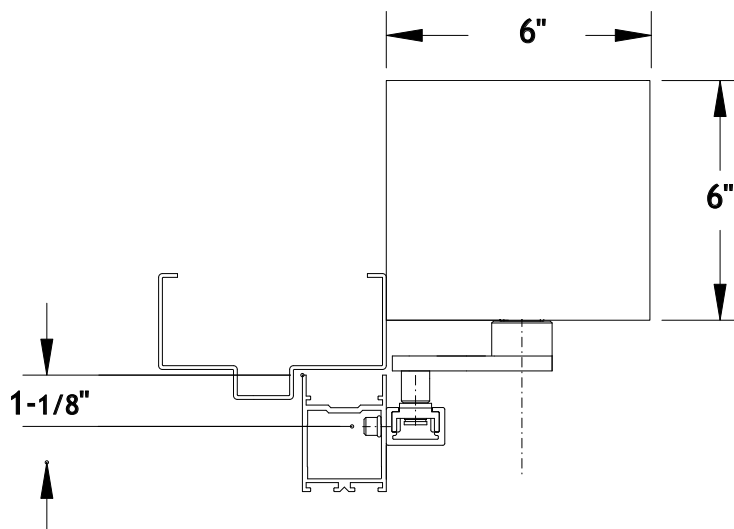
## Section D: Mount the Push Arm



### Section E: Mount the Pull Arm (For 0" Reveals)



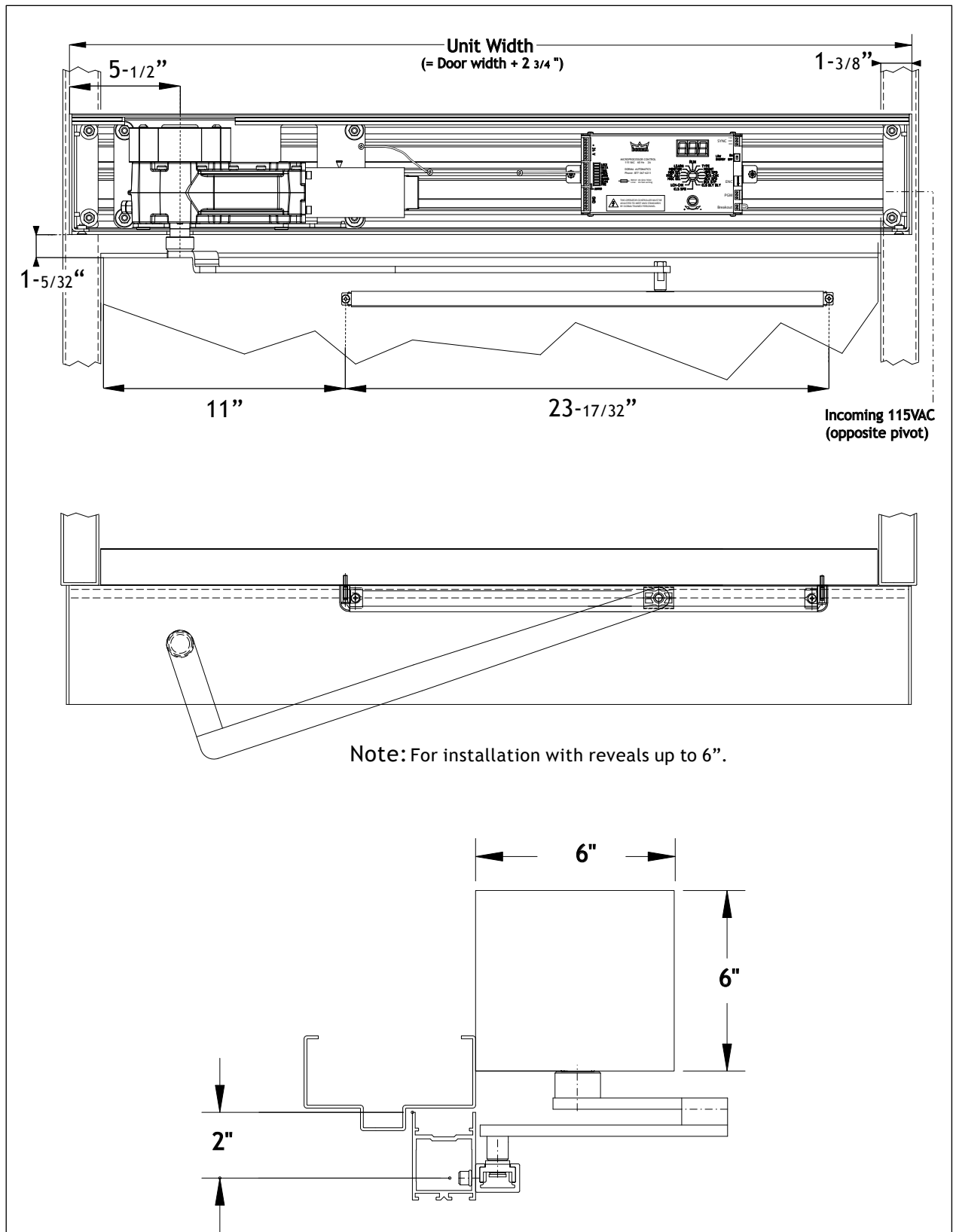
Note: For installation with 0" reveals.



**18** Installation of Surface Applied - Pull Application.

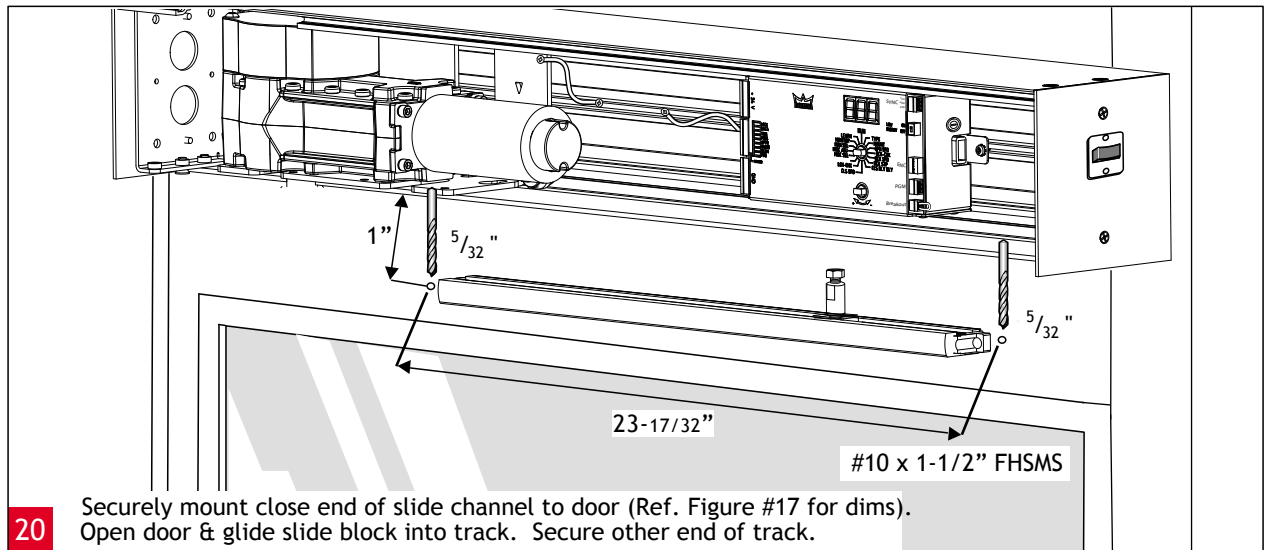


Section E: Mount the Pull Arm (For Reveals up to 6")

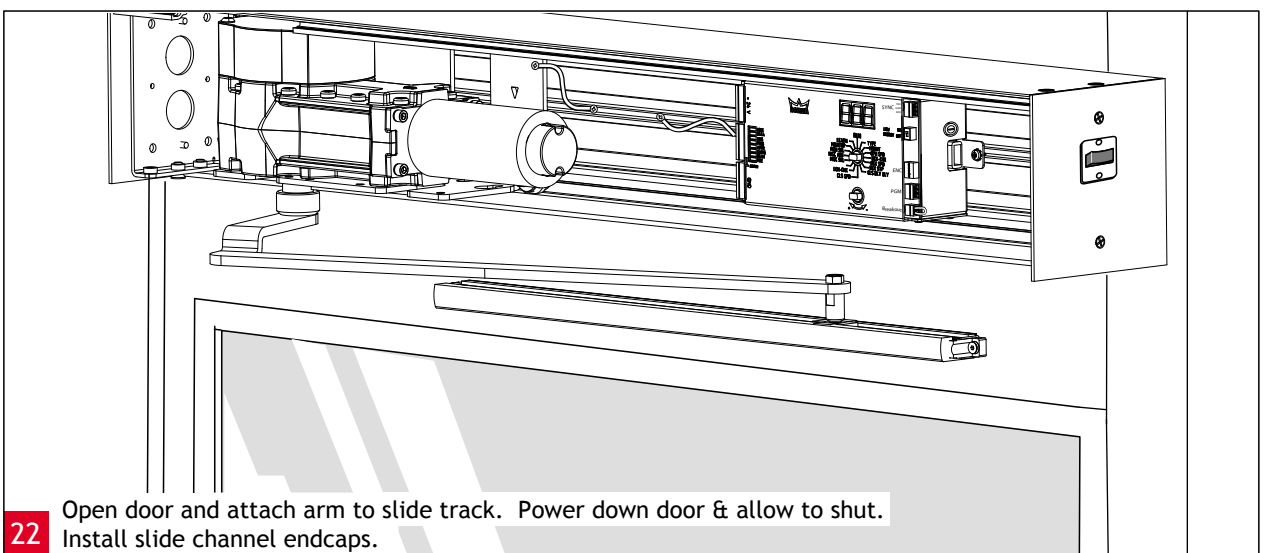
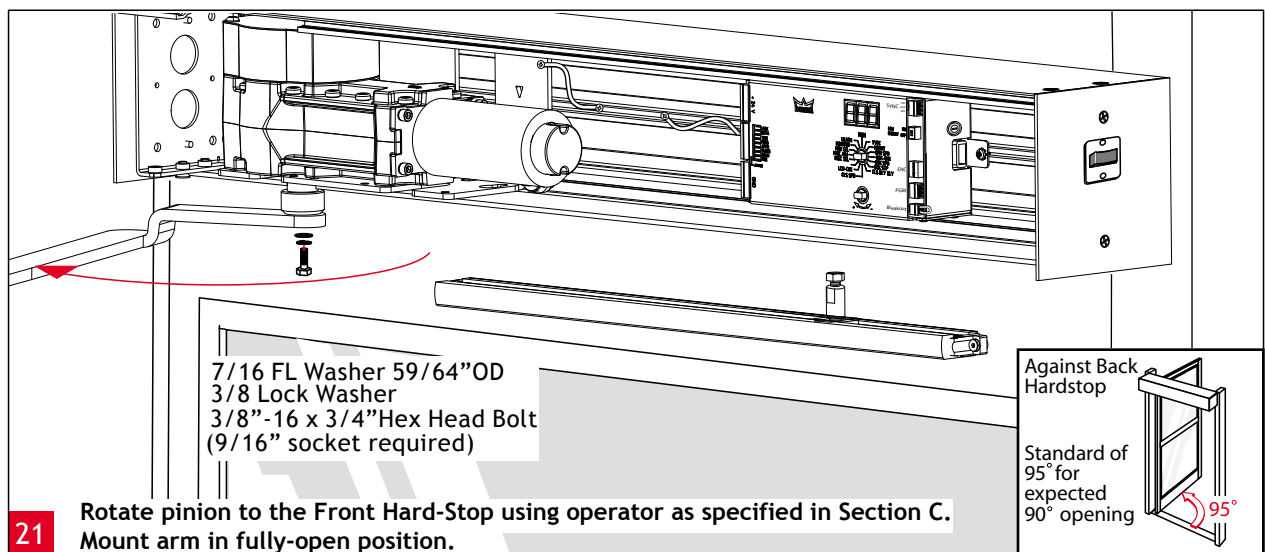


**19** Installation of Surface Applied - Pull Application.

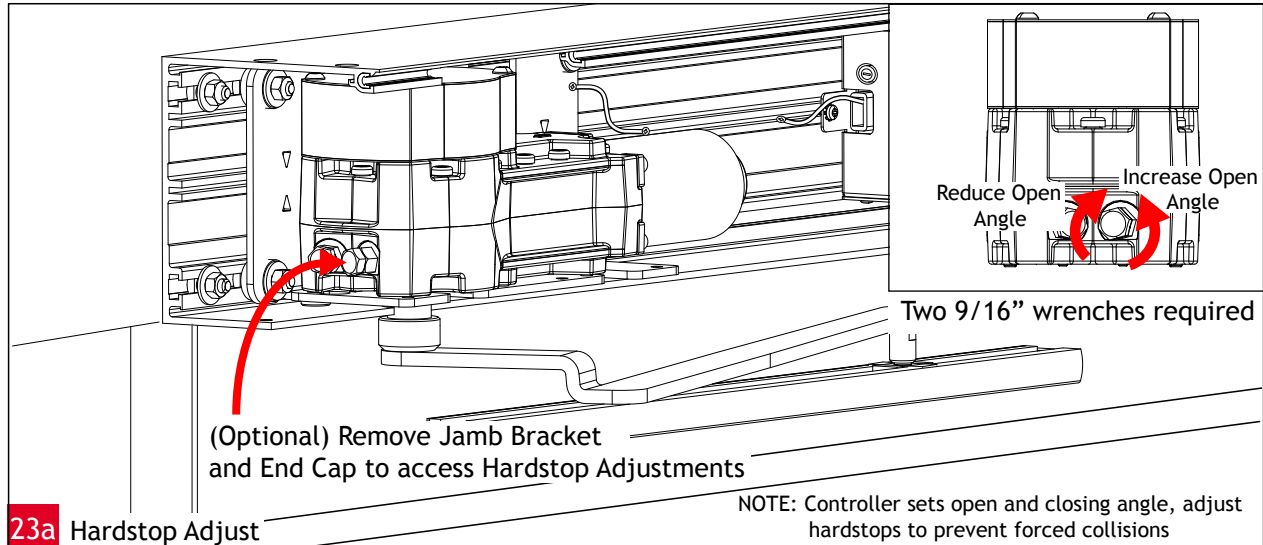
## Section E: Mount the Pull Arm



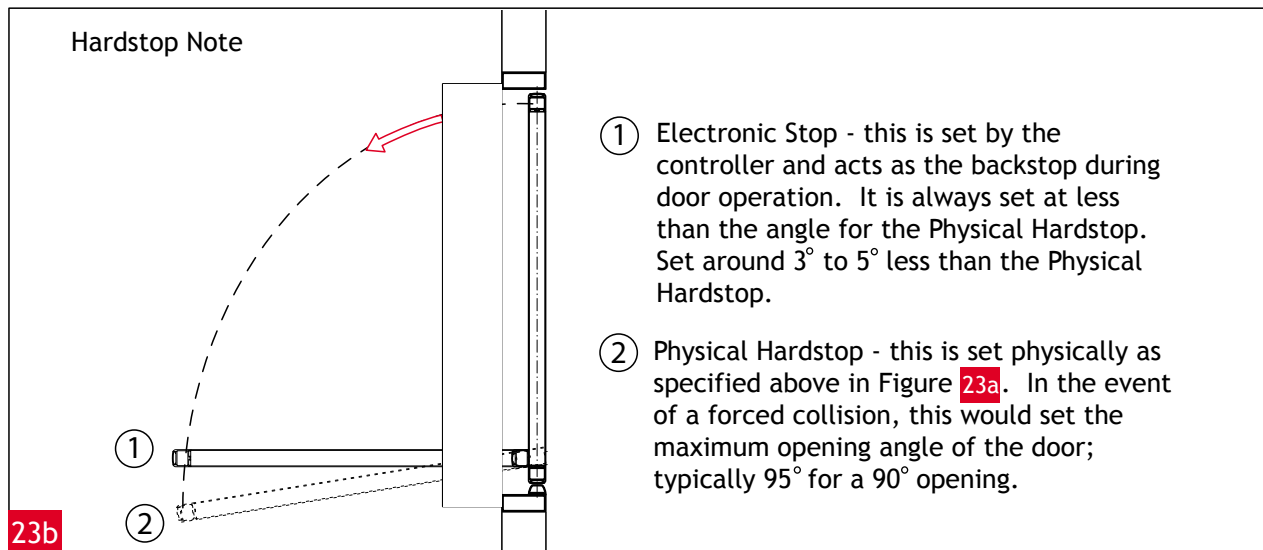
E



## Section E: Mount the Pull Arm



**23a** Hardstop Adjust



**23b**

## Section F: Basic Set-Up

The purpose of the initial setup is to bring the ED400 to a point where it can open the door. If the door panel is to be mounted, please refer to Section B.

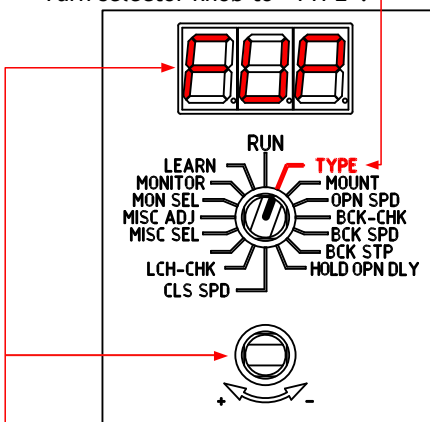
### Preparation for Initial setup

#### Basic Requirements

- All cables are connected.
- Swing area is clear of obstacles
- Mode switch in position "OFF".
- Controller must have "Low Energy Switch" in "OFF" position.
- Power connected.

### Start-Up

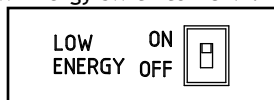
- Turn selector knob to "TYPE".



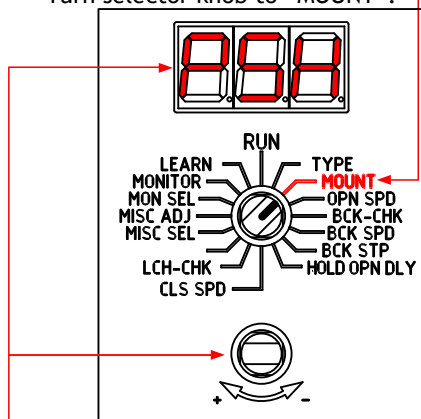
- Turn dial knob to select "Low Energy", "Power Assist", or "Full Power". The corresponding 3 letter codes are "LE", "PA", and "FUP".

The example above shows "Full Power".

NOTE: for "Low Energy" operation, turn the Low Energy switch to "ON".

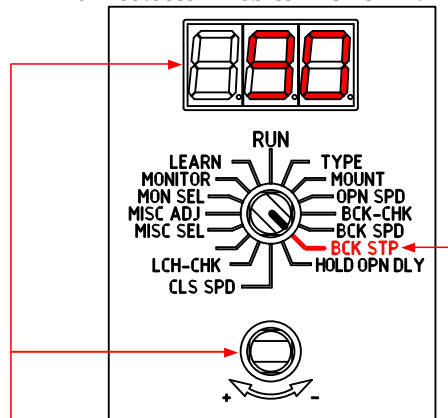


- Turn selector knob to "MOUNT".



- Turn dial knob to select Push Mount "PSH" or Pull Mount "PUL".

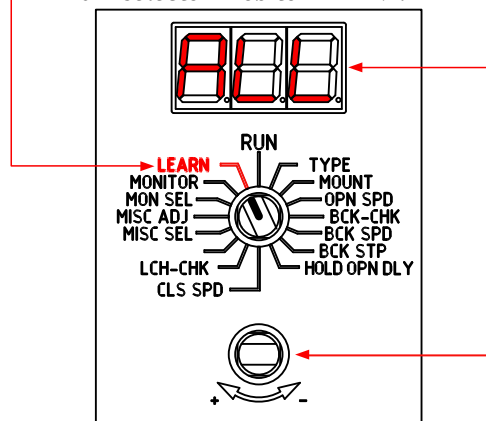
- Turn selector knob to "BCK STP".



- Turn dial knob so that display shows "90". This is your back stop in degrees.

NOTE: If the door is to be set to an angle other than 90°, measure the angle the door will open to and input that value in the step above.

- Turn selector knob to "LEARN".

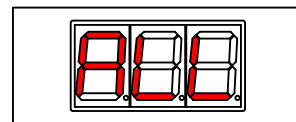


- Turn dial knob so that display shows "ALL". This will cause a full learn cycle.
- Turn mode switch from "OFF" to the "ON" position.

OFF → ON



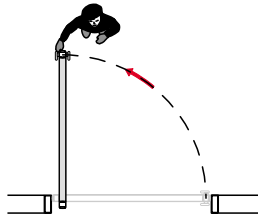
- The controll box display will show "ALL", indicating that a learn cycle is in progress.



The door will stay closed for 10 seconds to let you get into position to catch it at the desired Back Stop.

## Section F: Basic Set-Up

- The door will begin to open slowly. Stop the door at the desired Back Stop position until it begins to close back to latch position.



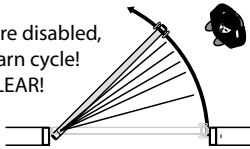
Please let the door close. Stand clear.  
Let go of the door and  
**MOVE OUT OF THE WAY!**



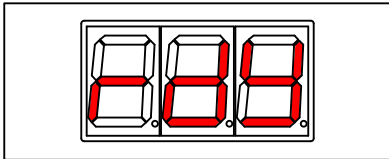
- The door will now SLAM open to 45°, to measure it's inertia.



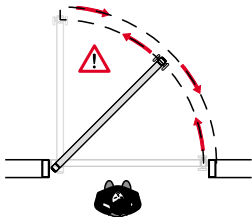
Sensors are disabled,  
during learn cycle!  
STAND CLEAR!



- When the controller has learned all of it's self-adjustments, the display will show "rdY".



- The door will now cycle open and close continuously. The door has reduced obstacle detection, **DO NOT INTERFERE WITH DOOR!**

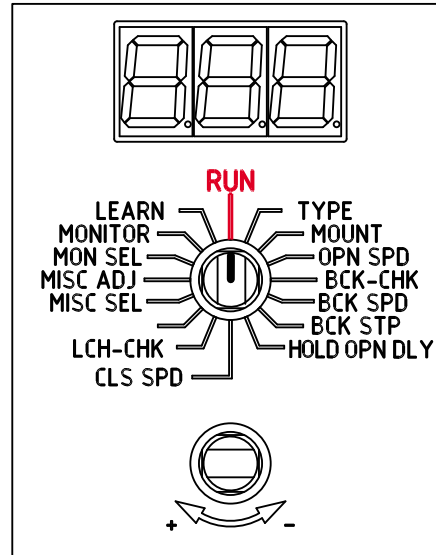


- If you are satisfied with the door's operation, turn the mode switch to the "OFF" position and allow the door to close completely.



NOTE: If door motion is undesirable or if adjustments need to be made to meet ANSI guidelines, refer to Section G to make additional changes (Open Speed, Back Check angle, Deceleration, Close Delay, CLosing Speed, etc.)

- Turn the selector knob to "RUN".



- The display will show the present state of the opener.

CODE	STATES	DESCRIPTION
C L d	Closed	Door is at Latch-Stop
O P n	Opening	Opener is opening to Back-Stop
P. A.	Power Assist	User may open door with opener's assistance
O P d	Opened	Opener is holding door at Back-Stop
C L r	Closer	Acts as a passive closer, letting user open door manually, closing the door
C. O b	Closing Obstacle	Opener reacted to obstacle during closing cycle
O. O b	Open Obstacle	Opener reacted to obstacle during opening cycle
A L L	Learning	Opener is learning
C y C	Cycle	Opener is going through a learning cycle
r s t	Reset	Opener is being reset

NOTE: If there is an exception to it's operation, it will show a code for it. If an exception code is displayed, see ED400 Controller Manual for an explanation.

- Test the opener's operation with the sensors.
- Test that the door meets ANSI standards.
- FOR ADDITIONAL SET-UP OPTIONS, SEE THE ED400 CONTROLLER MANUAL. (www.dorma-usa.com)**

**The door is now ready for normal operation.**

## Section G: Customized Set-Up

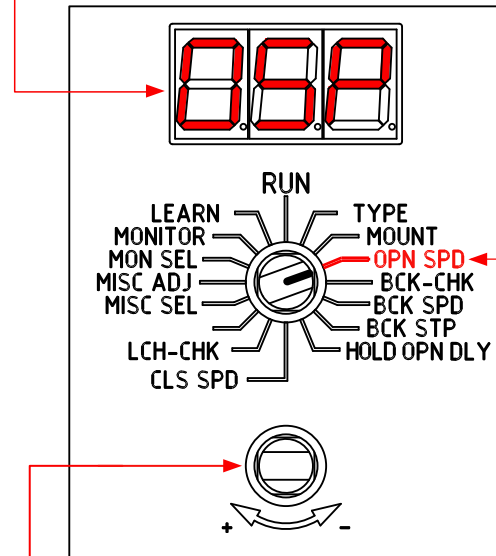
The purpose of the customized set-up is to change the default ED400 settings. This can be done during or after a completed learn cycle.

**Parameters**

- Open speed to Back-Check
  - Back-Check angle
  - Deceleration through Back-Check
  - Back-Stop angle
  - Close Delay
  - Closing speed to Latch-Check
  - Latch-Check angle
  - Closing speed through Latch-Check
- 
- Using the example to the right, and the table below, make parameter changes as desired. When finished, return the selector knob to “RUN”, or do another “LEARN” Cycle if the door’s motion has been poorly affected.
  - For further Set-Up options contained in “MONITOR”, “MON SEL”, “MISC ADJ”, and “MISC SEL”, please consult the ED400 Controller Manual. It can be found at the DORMA website: [www.dorma-usa.com](http://www.dorma-usa.com) .

### Open Speed to Back-Check (example)

- Turn selector knob to “OPN SPD”.
- The display will show the code and the value.



- Turn the dial knob to select the desired speed in DEGREES/SECOND.



Selector	Code Meaning	“Dial” Knob Function	DISPLAY	UNITS
OPN SPD	Open Speed	increment/decrement	Opening speed to Back-Check	°/s
BCK-CHK	Back-Check	increment/decrement	Back-Check angle	°
BCK SPD	Back-Speed	increment/decrement	Opening speed to Back-Stop, or Off	°/s
BCK STP	Back-Stop	increment/decrement	Back-Stop angle	°
HOLD OPN DLY	Hold Open Delay	increment/decrement	Time at Back-Stop	s
CLS SPD	Close Speed	increment/decrement	Max closing speed to Latch-Check	°/s
LCH-CHK	Latch-Check	increment/decrement	Latch-Check angle	°

### RESETTING THE CONTROLLER

- To RESET the controller, turn the selector knob to “MISC SEL” and turn the dial knob until “rst” is displayed. Now turn the selector knob to “MISC ADJ”, and turn the dial knob from “ON”, ONE click clockwise to “OFF”. The controller has now been reset.

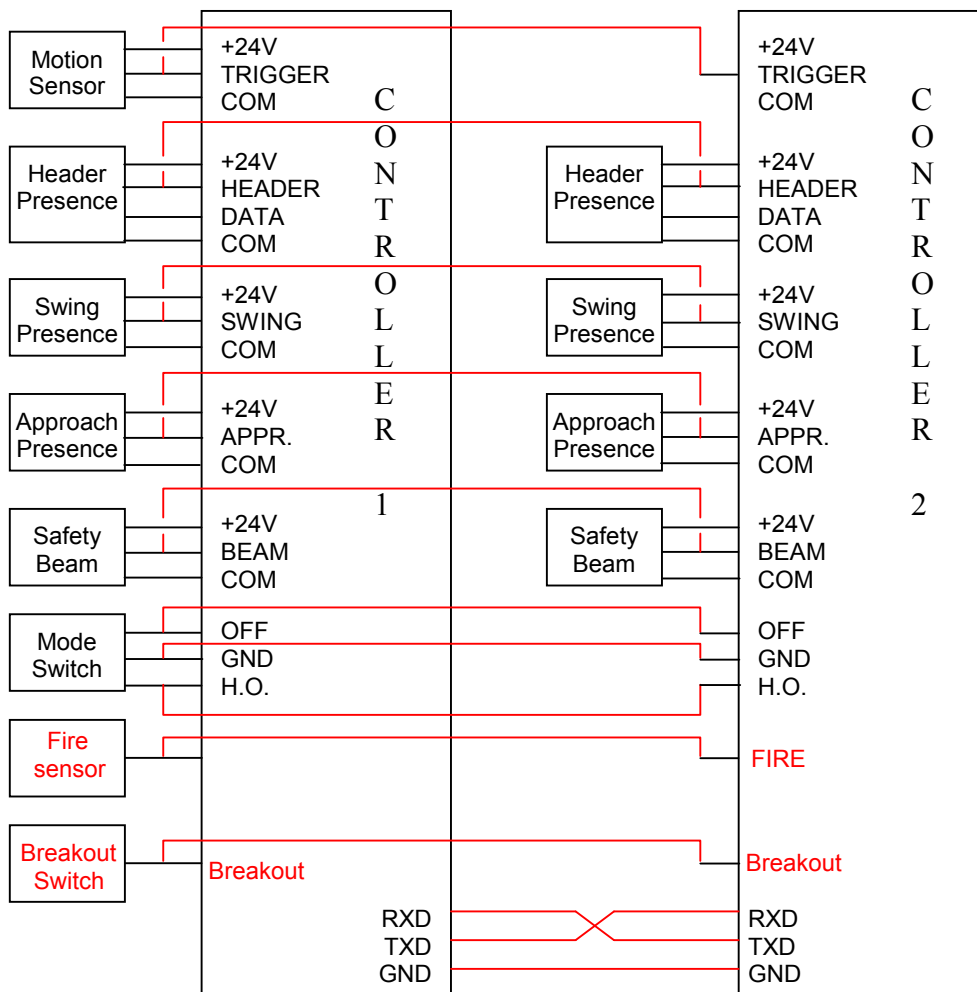
## Section H: Setting Up Simultaneous Doors

The purpose of this setup is to synchronize two side-by-side doors for simultaneous operation. This operator is not compatible with over-ribated doors.

### Connecting the Controllers

- Connect the grounds of the two controllers together.
- Connect the motion sensor to both controllers in parallel.
- Connect the presence sensor to both controllers in parallel, except for the Data Line.
- Let each controller power its presence sensors (either controller can power the motion sensor).
- Connect a single program switch to both doors in parallel.
- Connect the RXD line of each controller to the TXD line of the other controller.
- If you use the “Fire” input, connect the Fire sensor to both controllers.
- If you use the “Breakout” input, connect the Breakout switch to both controllers.
- Connect both controllers to the same AC power source.
- Program the two controllers identically (Refer to Sections F and G).

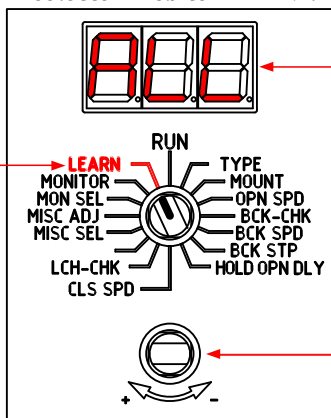
(Continued on following page)



## Section H: Setting Up Simultaneous Doors

- Run a “Learn” cycle on both controllers. It’s easier if they are done separately.  
If it’s desired that the doors open and/or close differently, continue on this side of the page. If not, skip to the top of the column to the right.

- Turn selector knob to “LEARN”.



- Turn dial knob so that display shows “ALL”. This will cause a full learn cycle.
- Open one of the doors and allow it to close. As it’s closing, flip the program switch from “OFF” to “ON”.



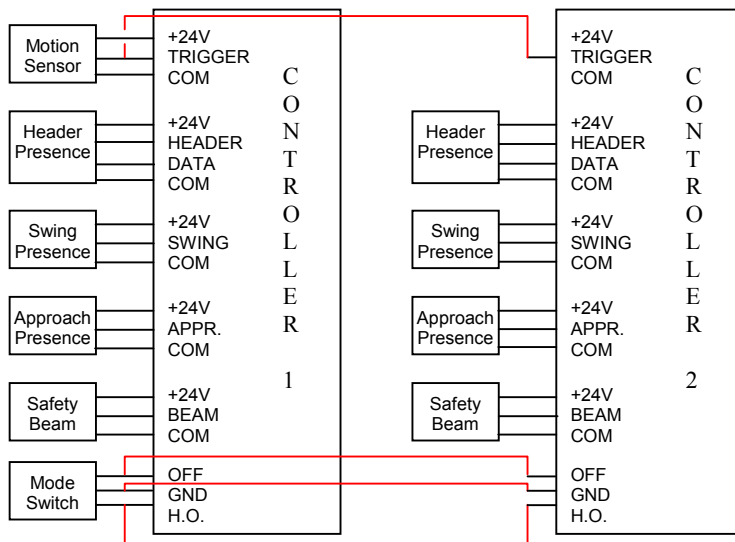
- The door that was closed will start a Learn Cycle, and the one that you opened will finish closing and then start a Learn Cycle. This will give you a chance to stop the first door at Back-Stop, and then walk to the second door and stop it at Back-Check when it gets there.
- When both openers are ready, trigger an automatic opening, and, as the doors are opening, block one of doors. Turn ON/OFF/HO switch to “OFF” position, then back to “ON”
- When they start moving again, block the other one. Turn ON/OFF/HO switch to “OFF” position, then back to “ON”.  
This will let each opener tell the other of having detected an obstacle, so that each will know of the presence of a second door. Knowing that, the openers will extend the Hold-Open time after an obstacle, to ensure that both doors remain in synchronization afterwards.

## Section I: Setting Up Semi-Independent Doors (Double Egress)

The purpose of the this setup is to synchronize two side-by-side doors for semi-independent operation. This means that the doors will open and close at the same time, but will react to obstacles independently.

### Connecting the Controllers

- Program the two controllers identically (for coordinated doors - one must close first - increase slightly the Closing Delay of the controller for the door that must close last)
- Connect the grounds of the two controllers together.
- Connect one door’s presence sensor to the controller for that door.
- Connect the motion sensor to both controllers in parallel
- Let each controller power its presence sensors (either controller can power the motion sensor)
- Connect a single program switch to both controllers in parallel.
- Power the controllers from the same AC power source.





## Section J: Magnetic Locks

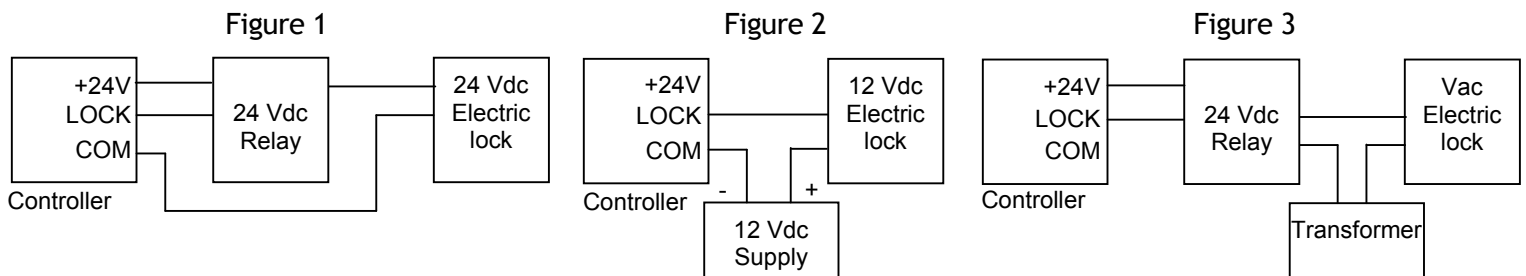
The purpose of this section is to setup an electric lock. The controller may power an electric strike through a relay or access control device.

### Connecting a Magnetic Lock

- If the installation has a 24 Vdc electric strike plate (electric lock), the controller is able to power it directly. (See Figure 1)
- For DC locks of other voltages, you will need a separate power supply. (See Figure 2)
- For AC locks, you will need a separate transformer and a relay. (See Figure 3)

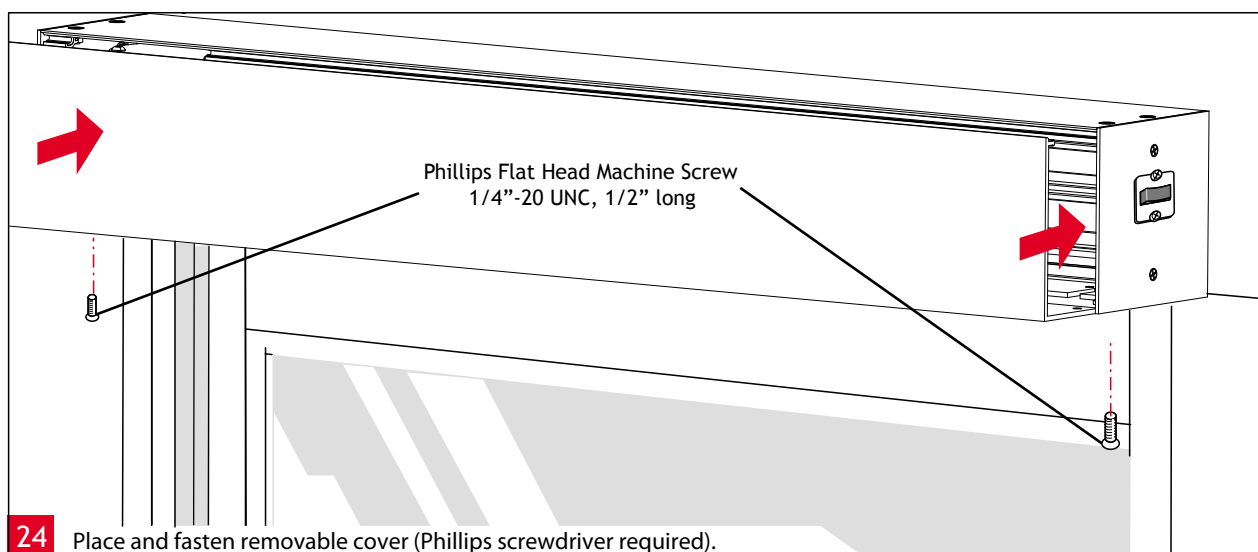
- The “Open Delay” must be set per manufacturer’s specification.
- The controller drives the electric lock from when it receives a valid trigger (at Latch-Stop), while waiting to open (because of a non-zero Open Delay, or because the swing area is occupied), and until some time after the door has begun to open. It also drives it if the door reaches Latch-Stop, as it is retriggered.
- The LOCK LED lights up while the controller drives an electric lock, whether or not a lock is actually present.

NOTE: For wiring locations on controller, see Section B, Figure 8.



## Section K: Final check

- Test all sensors along with door operation to ensure they are working properly.
- Provide safety list similar to that provided by AAADM.
- Make sure that all electrical wiring is connected correctly and away from moving parts.



## Section L: Technical Data

### Operator

Line Input	100 to 125V AC, 60 Hz, 2 A max.
Power supply for external sensors	24 V DC, 0.8 A
Fuse	2 A fast blow
Ambient Temperature	77 °F (25 °C)

### Adjustments

	min.	max.
Opening time to Back-Check	2.0 s	7 s
Closing time to Latch-Check	2.5 s	7 s
Delay before Opening	0 s	3 s
Delay before Closing	1 s	25 s
Back-Stop Angle	60°	120°
Back-Check-Angle	50°	120°
Latch-Check-Angle	10°	30°
Wall-Mask-Angle	60°	115°
Extra Power Hold Torque	40 ft-lb	240 ft-lb

### Door

	min.	max.
Door height	84"	102"
Door weight	60 lbs (27 kg)	320 lbs (145 kg)
Door mount - single	SA (Surfaced Applied Mounting)	
Door width	37"	51"
Door mount - pair	SA (Surfaced Applied Mounting)	
Door width	62"	98"

### Controller Technical Data

Power input	
Connector	2-piece terminal block
Line Input	100 to 125Vac, 60 Hz, 2 A max.
Fuse	2 A, fast (5mm x 20mm)
DC power out	24 Vdc, 800 mA out, always on, short circuit protected, not regulated
Control inputs	
Connector	2-piece terminal blocks
Active low inputs:	
	Open-Trigger (radar or push plate)
	Presence, jamb mounted sensor
	Safety Side, door mounted sensor
	Approach Side, door mounted sensor
	Hold-Open
	Off
	Safety Beam Sensor
Polarity	active low or closed contact to ground
Active threshold	< 0.8 Vdc
Inactive threshold	> 2.0 Vdc
Closed contact current	10 mA surge, 1 mA steady state
Open circuit voltage	5 V
ESD protection	±5 KV, human body model
Overvoltage protection	±5 Vdc or 5 Vac, continuous, with respect to GND
Smoke (Kill) link input:	
Polarity	normally closed contact to GND
Closed contact current	2 mA
ESD protection	±5 KV, human body model
Overvoltage protection	±5 Vdc continuous, with respect to GND
Indicators	1 LED/Sensor, 3-Digit Display

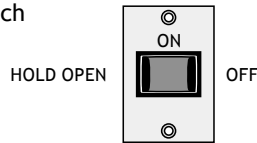
### Terminal Designations

1-8	+24V	
9	Electric Strike	-Output
10	Data (Zone)	-Output
11	Trigger (radar or push plate)	-Input
12	Presence (jamb mounted sensor)	-Input
13	Safety Side (door mounted sensor)	-Input
14	Approach Side (door mounted sensor)	-Input
15	Safety Beam	-Input
16	Kill (Smoke) link	-Input
17-24	GND	
Program switch		
3	Hold Open	- Input
2	GND	
1	OFF	- Input
Breakout		
1	Breakout Switch	-(N.C.)
2	GND	
Motor		
1	M+	
2	M-	
Power Input		
1	Neut.	
2	Earth Ground	
3	Hot	100 to 125 VAC, 60 Hz, 2 A max.

## Section L: Technical Data

### Operation Instructions

#### 1. Program Switch



Switch is in position:



**Continuous Open Operation**  
The door opens to the full opening position and remains in this position.



When an activation signal is detected from the motion detector the door opens to the full opening position. After the hold open delay expires the door closes.



The door stops immediately when the switch is placed in this position and closes slowly under springpower. The closing speed is limited. The user may open the door manually.

#### Restart after power failure

When the power is turned ON, the ED400 goes back to normal operation.

#### 2. Care and Maintenance

Prior to first use and periodically thereafter, but at least once a year, the system must be checked and maintained by a qualified, knowledgeable technician. During the cleaning operation the Program Switch must be either in the OFF or HOLD OPEN position to avoid automatic movements of the door wings. Always disconnect the appliance before servicing. The entire swing door assembly (Aluminum, Glass, Covers) can be cleaned with a moist towel and common commercial cleaners. The safety sensors are to be cleaned with a dry, soft, non-abrasive towel. The floor area near the swing door panel, including the threshold must be kept clean.

#### 3. Self Help Troubleshooting of Problems

If the door does not open or close, check the following:

- Is the line power in order?
- Is the Program Switch in the proper position?
- Is the safety sensor path clear and clean?
- Is the door blocked by obstacles?

If all of the above check out OK call a qualified Service Technician.

ED400 MUST BE SET UP WITHIN  
BHMA/ANSI STANDARDS

