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# Benchmark<sup>™</sup> Swing Operator

## Installation Instructions

### **DOR - O - MATIC®**

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## INTRODUCTION

This system is a fully automatic electro-mechanical swinging door operator for residential, commercial, and industrial pedestrian use. It can be used to automate center pivoted doors, as well as hinged or offset pivoted doors.

This operator is a "start on demand", "power-open/spring close" system. The swinging door is driven under power to the full open position, at which time the electrical power is turned off and the door is closed by spring force only.

The opening and closing cycles of the door are under complete control at all times, as individual potentiometers or switches independently control the opening speed, back check speed, hold open time delay, closing speed and latch position. In the event of a power failure, the operator acts as a manual door closer (size 3) without fear of damage to the door or the automatic door components.

The activating circuit will re-open the door from any position in the closing swing, provided the safety circuit is not energized. The surface applied operator may be installed for either push or pull applications on center pivoted, hinged, or offset pivoted doors. The basic components of this system are the Operator & Cover Assembly, the Arm Assembly, and the Screw Bag (**Figures 1, 5, 9, 14 & 19**).

## GENERAL

This instruction sheet covers the proper installation of surface applied operators for use on center pivoted, butt hung/hinged, or offset pivoted doors. BEFORE proceeding with any stage of the installation...

- A. Check architectural drawings and final approved shop drawings for position of the frame and structural openings.
- B. Check header & frame dimensions, making sure to allow for the proper clearances (**Figures 2, 6, 10, 15, 20**).
- C. Check the content of the shipping container against the bill of material to see that all necessary parts and materials have been included. Also, be sure that the model is correct for the required application.
- D. Remove the motor/gearbox and control box to install the mounting plate (**Figures 3, 7, 11, 16, 21**).
- E. Refer to proper diagrams in this manual for either *Push Arm* or *Pull Arm* installation.
- F. This operator is for indoor use only.
- G. Do not mount any accessories directly onto this operator.
- H. When additional accessories are used with this operator, refer to the instructions for those devices.
- I. Tools required for installation:
  - a) 10mm socket
  - b) 10mm open end wrench
  - c) 6mm allen wrench
  - d) Phillips screwdriver
  - e) Drill, drill bits & taps
  - f) Flat head electric screwdriver

**NOTE: Always disconnect main power to operator prior to servicing or cleaning.**

## INSTALLATION INSTRUCTIONS

1. Preparation:

A 115 volt, single phase, 60Hz, fused, 15 amp, 3-wire power supply must be brought to the side jamb tube. This work is usually supplied by the electrical contractor. UL approved type flexible conduit is recommended for running the 115 volt power supply into the operator. Determine the location of the wire passage holes through the side jamb (**Figures 4, 8, 12, 18, & 22**). Approximately 12" of wire should be left for hook up.

NOTES:

  - A. Secure all conductors and connections against physical damage.
  - B. Route all wiring away from moving parts, sharp edges and heat sources.
  - C. Use copper conductors only.
2. Pre-Operational Adjustments:
  - A. Using the appropriate wiring diagram (**Figure 25 for Standard or 26 for Premium**) connect power and accessories as needed.
  - B. Select proper function using SW2: (Premium Control Box only)
    - Function 0: General Equipment – Any device not manufactured by Dor-O-Matic.
    - Function 1: 77700-900 No Beam.
  - C. Turn on power at the switch. After the first activation signal, the door should open and close one time, after which it is ready for normal operation. If the door does not size to the full open position, first check for binds, then increase the sizing speed by rotating P7 clockwise on the Standard Control Box or P8 counter-clockwise on the Premium Control Box just enough to overcome the door weight, etc.
3. Operational Check and Adjustments:

NOTE: Refer to the latest revision of ANSI/BHMA A156.19-1997 Standard for Power Assist and Low Energy Power Operated Doors for all settings and adjustments.

Latch Location:	10 degrees or more
Latch Speed:	1.5 seconds or more
Closing Speed:	3 seconds or more
Opening Speed:	3 seconds or more

  - A. Opening Speed Adjustment:
    1. Opening speed is adjusted by rotating P1 (CCW=SLOWER, CW=FASTER) on the Standard Control Box or P2 (CW=SLOWER, CCW=FASTER) on the Premium Control Box. It allows for proper adjustment of any normal weight and size door.
    2. Cycle the door open and closed several times and observe the opening speed.

NOTE: It is recommended that the door be operated as slow as is practical for the traffic conditions.

- B. Back Check Speed Adjustment:  
The back check speed is controlled by rotating P2 (CCW=SLOWER, CW= FASTER) on the Standard Control Box or P3 on the Premium Control Box (CW=SLOWER, CCW= FASTER).
- C. Hold Open Time Delay Adjustment:  
Adjustment is made by rotating P3 (CCW=LESS HOLD OPEN TIME, CW=MORE HOLD OPEN TIME) on the Standard Control Box or P1 (CW=LESS HOLD OPEN TIME, CCW=MORE HOLD OPEN TIME) on the Premium Control Box. The total adjustment range on the control box is 1 to 30 seconds of time delay.
- D. Back Check Position:  
Standard Control Box: The adjustment is made by P4 (CW=MORE BACK CKECK, CCW =LESS BACK CHECK).  
Premium Control Box: There is no adjustment available on the back check position, since the microprocessor in the control box sets the proper back check position automatically while the door sizes itself.
- E. Latch Position:  
By rotating P5 (CW=MORE LATCH, CCW=LESS LATCH) on the Standard Control Box or P6 on the Premium Control Box, one can vary the position at which latch occurs (CCW=MORE LATCH, CW=LESS LATCH).
- F. Closing Speed Adjustments:  
Continue to cycle the door open and closed while making adjustments. Set the closing speed by rotating P6 (CW=SLOWER, CCW=FASTER) on the Standard Control Box or P7 (CW=SLOWER, CCW=FASTER) on the Premium Control Box.
- G. Latch Speed:  
Latch speed is factory set and has no adjustment.
- H. Power Boost Close and Power Boost Hold Features (Only available with Premium Control Box):
1. This is a built in feature that can be turned on or off with SW1-3.
  2. When this feature is on, it can be set for 5 second power only.
  3. It is used to electronically increase the closing force of the door from 9 lbs. to 18 lbs. in order to close and hold the door closed against high winds or high stack pressure.
  4. When the power boost close and hold feature is turned on, the automatic increase in power occurs approximately 7 seconds after the door has closed to the latch position. The power boost feature will not turn on during the first 80 degrees of the closing door travel.
- I. Push-N-Go Feature:  
With this feature, after three to five degrees of manual door travel, power assist takes over and the door opens under power the rest of the cycle. This is selected with SW1-2.
- J. Delayed Activation Feature:  
When delayed activation is selected, there is a 1 second delay between reception of the activation signal and the actual door opening. This allows for most electric strikes, panics, etc. to disengage before the door opens. This is selected with SW1-1.
4. Operational Walk Through Test:  
NOTE: It is assumed that during the installation process, any problems would have been found and corrected before this point. However, it is recommended that a complete walk-through test now be performed.
- A. Activate door operator. The door should open smoothly and silently to the back check point, where it should slow down and drift into full 90 degrees open without slamming.
  - B. Maintain the activation signal to ensure that the door does not time out and close while being activated.
  - C. If a door safety device is used, step on through the door opening and into the safety area. Again, remain in the safety area making sure that the door does not close while the safety area is occupied.
  - D. Step out of the safety area. After both the activating and safety areas are clear, the door should time out at the pre-set time delay period. The door should then close quietly and smoothly to the latch point, where it slows down and drifts into the fully closed position without slamming.
  - E. Safety Function with the Door Closed
  - F. Step back into the safety area, and have someone else activate the door. The door must not open.
    1. Step out of the safety area. The door should open fully. Have the other person release the activation signal. The door should stand open until the end of the time delay cycle, and then close as before.
5. Release of the System for Service:
- A. Remove all tools and installation equipment, and clean any debris from the vicinity of the door.
  - B. Install all safety, traffic control, and instruction decals to the door as required by ANSI 156.19-1997. THIS IS VERY IMPORTANT! Failure to do this leaves the installer LIABLE for any accident that might occur. THIS MUST BE DONE!
  - C. Verbally explain the proper operation of the door system to the owner or to the person in charge.

## DO'S AND DON'TS

1. Do use this operator on standard pedestrian doors, exterior and interior, weighing up to 200 pounds. For doors greater than 200 pounds, consult factory.
2. Do Not connect any remote activating device to the door unless it is located within the "line of sight" of the door.
3. Do Not use a fuse larger than specified.
4. Do Not modify the factory wiring or connect any wiring into an existing electrical circuit or any other electrical device.
5. Do Not connect the 115 volt power supply line into the building lighting system operating FLUORESCENT LIGHTS.
6. Do Not mount any accessories directly to this operator.
7. Do make certain that the operator is connected to a dedicated 115 volt circuit from the main circuit breaker panel.
8. Do make certain that the operator is properly grounded with a separate green wire.
9. Do make certain that all connections are proper and secure before turning the power on.
10. Do make certain that all wires are properly dressed and secured to prevent any interference.
11. Do make certain that all safety labels and instruction decals relating to door operation are properly applied to the door before leaving the job.
12. Do verbally instruct the owner or person in charge of the proper operation of the door.
13. Do make certain that this operator is only used indoors.
14. Do disconnect main power to the operator prior to servicing and cleaning.
15. Do instruct the owner or person in charge of his responsibility of inspecting the door for the following:
  - A. Occasional damage
  - B. Developing problems
  - C. Minor preventative maintenance
  - D. Who and where to call for service when required

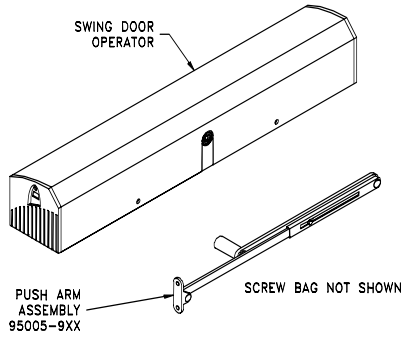
## REPLACEMENT PART LIST

Part	27" header	Full Length Header Single	Full Length Double
Standard Control Box	99402-900	99402-900	99402-900
Premium Control Box	99401-900	99401-900	99401-900
Gear Box	99403-900	99404-900	99403-900
Cover	95171-9XXR	99201-9XXR	99201-9XXR
Insert	<b>N/A</b>	99067-9XX	<b>N/A</b>
End Caps	99060-900	99060-900	99060-900

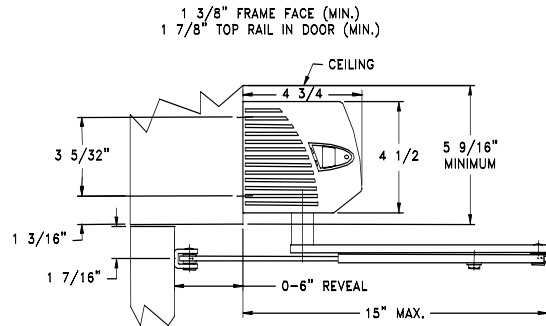
	Standard Push	Extended Reveal Push	Pull
Arm Assembly	95005-9XX	95025-9XX	95085-9XX

Note: 75- US 28  
79- DC 13

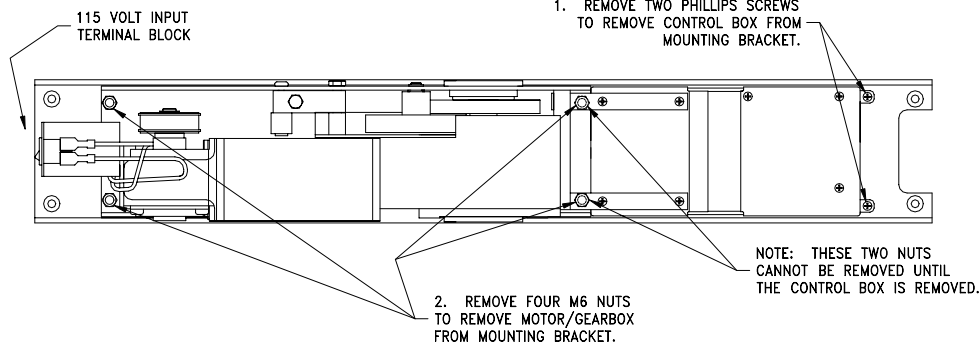
## 27" Push Arm



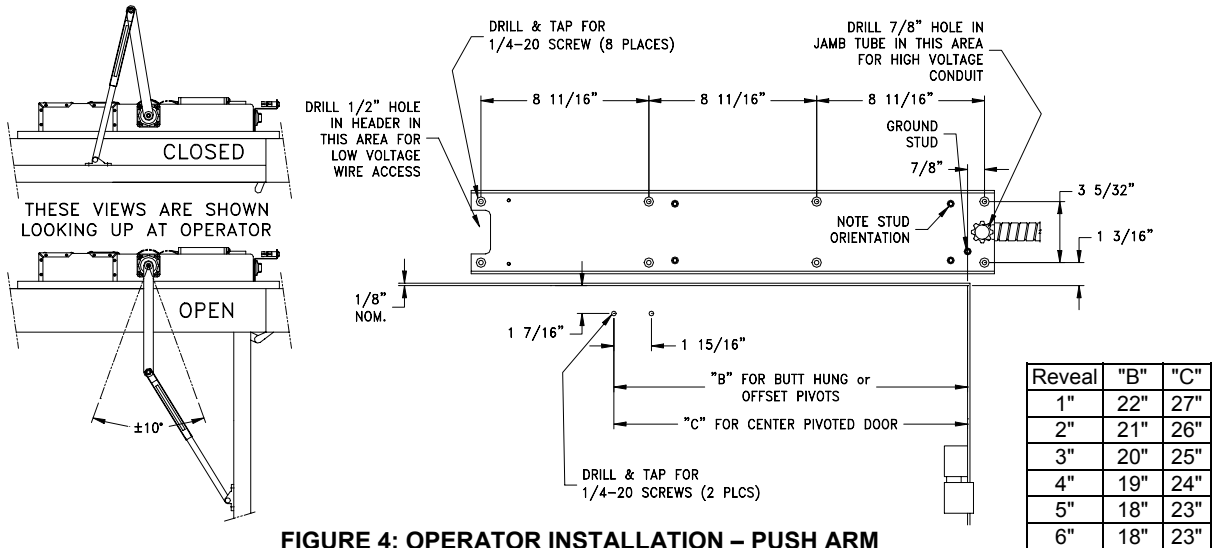
**FIGURE 1: SYSTEM COMPONENTS – PUSH ARM**



**FIGURE 2: OPERATOR CLEARANCES – PUSH ARM**



**FIGURE 3: MOTOR/GEARBOX & CONTROL BOX REMOVAL**

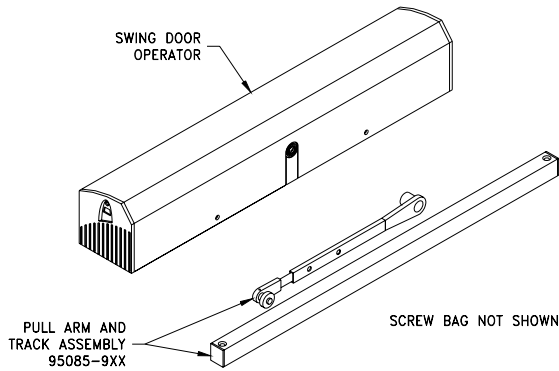


**FIGURE 4: OPERATOR INSTALLATION – PUSH ARM**

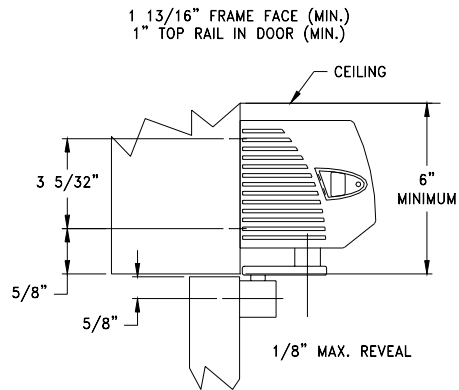
**Installation and Arm Adjustment Notes:**

1. Remove the control box and motor/gearbox from the mounting bracket (Figure 3).
2. Mounting bracket must be installed with the thread studs near the hinge to ensure correct operator orientation.
3. After installing the mounting bracket on the header or frame, install the motor/gearbox onto the studs with the 4 nuts provided and then install the control box onto the mounting bracket with the 2 flat head screws provided.
4. Push the 4 prong green plug into the green socket, push the 2 prong green plug into the green socket and the 3 prong green plug into the socket marked "main, ground, neutral".
5. Connect power to the terminal block (Figure 3), matching black to black (live), white to white (neutral), and ground to the grounding stud.
6. Connect all activation devices in parallel to the "Activate" and "Common" terminals (**Figure 25 for Standard, 26 for Premium**).
7. Before attaching the arm to the unit, activate the operator to the full open position by placing a jumper wire across the "Inside Activation" terminals to put the operator in the hold open position. Attach the shoe to the door. Attach the arm to the operator with the 8mm socket head screw (loosely) and adjust the arm to the desired door position together with the shoe. Once the desired position has been chosen, tighten both the 8mm socket head screw and the nut connecting the two parts of the arm. Remove the jumper wire.
8. Snap the end caps into the cover and secure with the (2) 6-32 round head screws provided. Snap in the optional end cap insert (provided in the screw bag) on the end cap opposite the on/off switch.
9. Install the entire cover assembly and the spindle insert with the screws provided.
10. Minimum door width for a push arm is 26 inches.

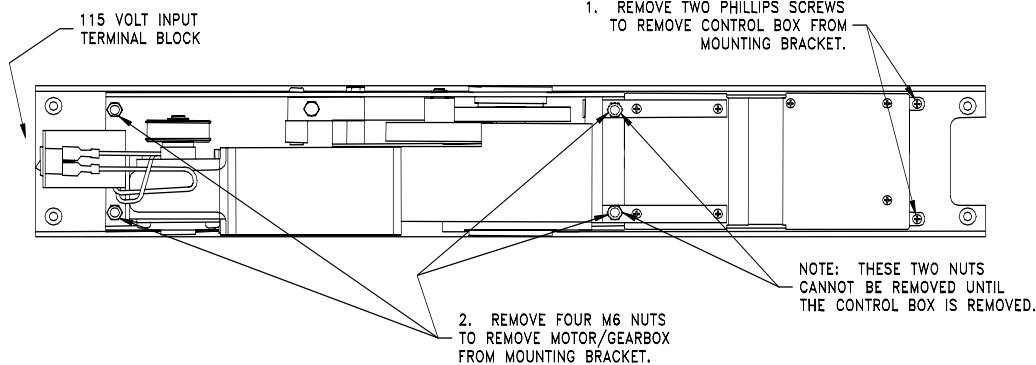
## 27" Pull Arm



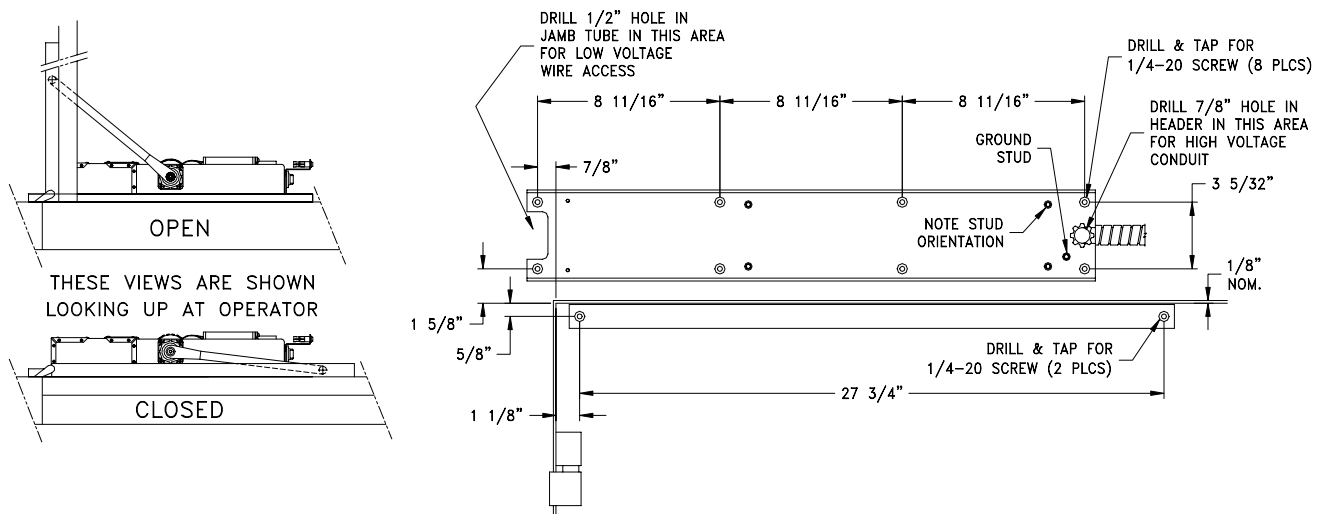
**FIGURE 5: SYSTEM COMPONENTS – PULL ARM**



**FIGURE 6: OPERATOR CLEARANCES – PULL ARM**



**FIGURE 7: MOTOR/GEARBOX & CONTROL BOX REMOVAL**



**FIGURE 8: OPERATOR INSTALLATION – PULL ARM**

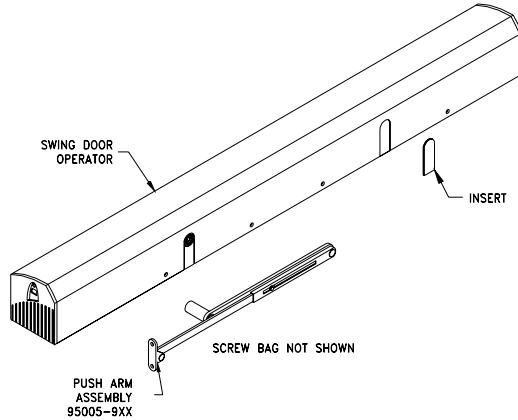
**Installation and Arm Adjustment Notes:**

1. Remove the control box and motor/gearbox from the mounting bracket (Figure 7).
2. Mounting bracket must be installed with the thread studs away from the hinge to ensure correct operator orientation.
3. After installing the mounting bracket on the header or frame, install the motor/gearbox onto the studs with the 4 nuts provided and then install the control box onto the mounting bracket with the 2 flat head screws provided.
4. Push the 4 prong green plug into the green socket, push the 2 prong green plug into the green socket and the 3 prong green plug into the socket marked "main, ground, neutral".
5. Connect power to the terminal block (Figure 7), matching black to black (live), white to white (neutral), and ground to the grounding stud.
6. Connect all activation devices in parallel to the "Activate" and "Common" terminals (Figure 25 for Standard, 26 for Premium).
7. Before attaching the arm to the unit, activate the operator to the full open position by placing a jumper wire across the "Inside Activation" terminals to put the operator in the hold open position. Attach the track to the door. Attach the arm to the operator with the 8mm socket head screw (loosely)

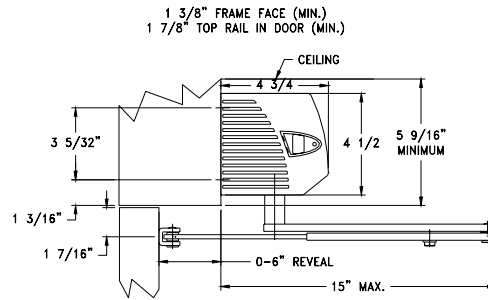
and adjust the arm to the desired door position together with the track. Once the desired position has been chosen, tighten the 8mm socket head screw. Remove the jumper wire.

8. Snap the end caps into the cover and secure with the (2) 6-32 round head screws provided. Snap in the optional end cap insert (provided in the screw bag) on the end cap opposite the on/off switch.
9. Install the entire cover assembly and the spindle insert with the screws provided.
10. Minimum door width for a pull arm is 30 inches.

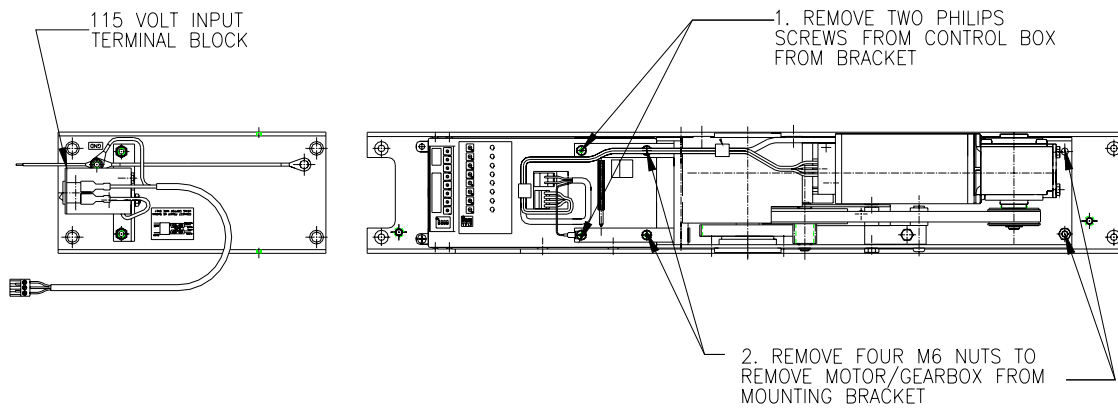
## Full Length Push Arm



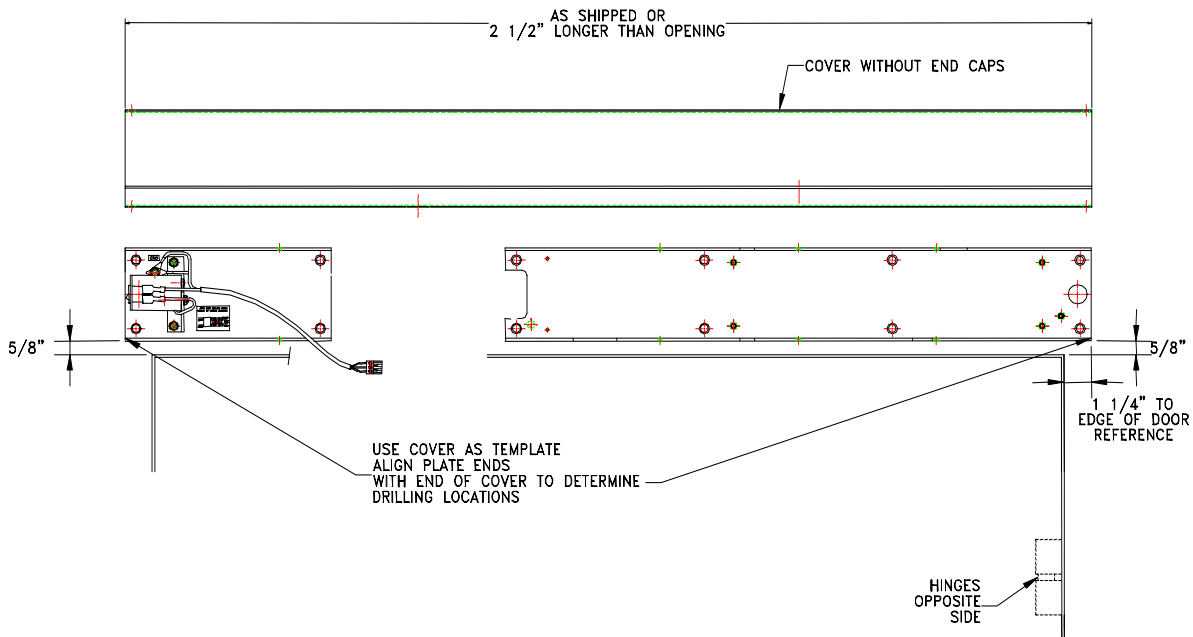
**FIGURE 9: SYSTEM COMPONENTS – PUSH ARM**



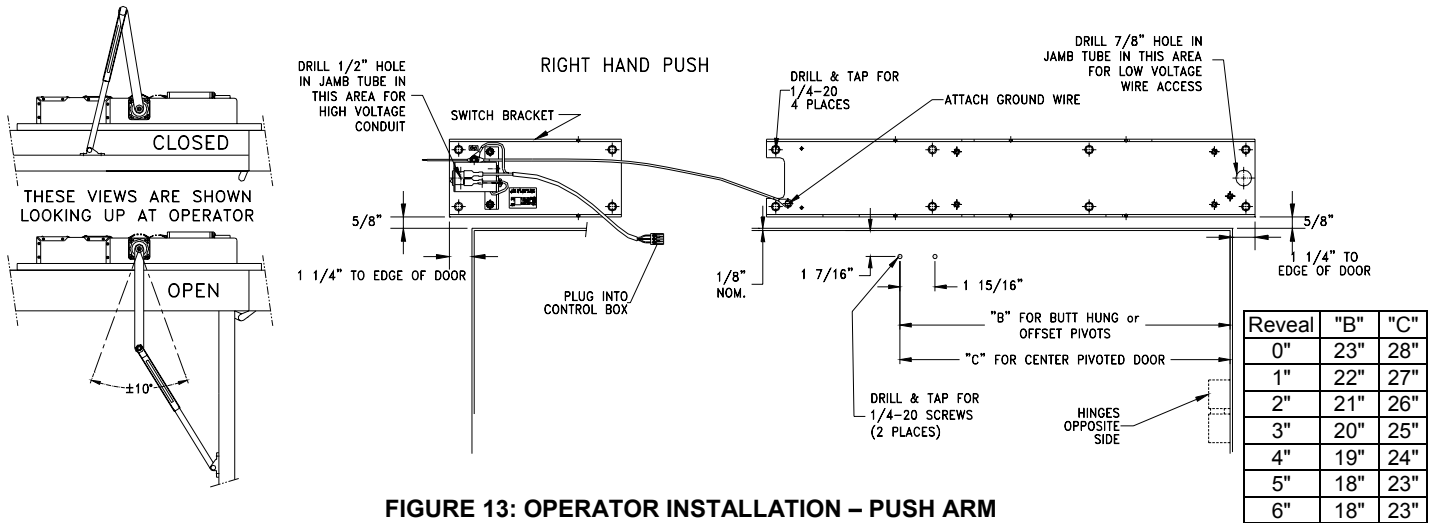
**FIGURE 10: OPERATOR CLEARANCES – PUSH ARM**



**FIGURE 11: MOTOR/GEARBOX & CONTROL BOX REMOVAL**



**FIGURE 12: CENTERING OPERATOR OVER OPENING**

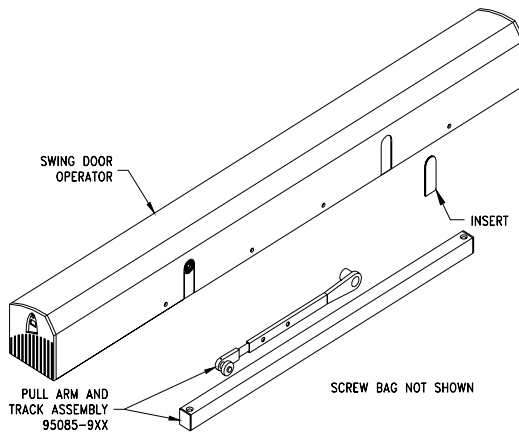


**FIGURE 13: OPERATOR INSTALLATION – PUSH ARM**

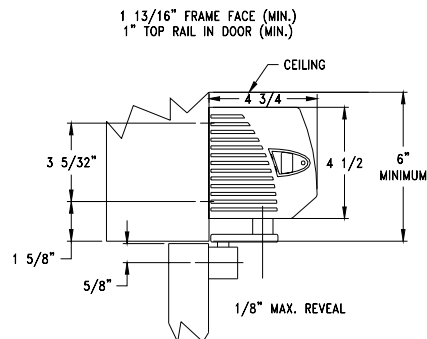
**Installation and Arm Adjustment Notes:**

1. Remove the control box and motor/gearbox from the mounting bracket (Figure 11).
2. Center operator over opening (Figure 12)
3. Mounting bracket must be installed with the thread studs near the hinge to ensure correct operator orientation. Mount switch bracket as shown (Figure 13).
4. After installing the mounting bracket on the header or frame, install the motor/gearbox onto the studs with the 4 nuts provided and then install the control box onto the mounting bracket with the 2 flat head screws provided.
5. For opposite side door, view will be mirror image of Figure 13.
6. Push the 4 prong green plug into the green corresponding socket, push the 2 prong green plug into the corresponding green socket and the 3 prong green plug into the socket marked "main, ground, neutral" located on the mounting screw side of the control box.
7. Connect power to the terminal block (Figure 3), matching black to black (live), white to white (neutral), and ground to the grounding stud.
8. Connect all activation devices in parallel to the "Inside Activate" terminal (Figure 25 for Standard, 26 for Premium).
9. Before attaching the arm to the unit, activate the operator to the full open position by placing a jumper wire across the "Inside Activation" (loosely) and adjust the arm to the desired door position together with the shoe. Once the desired position has been chosen, tighten both the 8mm terminals to put the operator in the hold open position. Attach the shoe to the door. Attach the arm to the operator with the 8mm socket head screw socket head screw and the nut connecting the two parts of the arm. Remove the jumper wire.
10. Snap the end caps into the cover and secure with the (2) #6 round head screws provided. Snap in the optional end cap insert (provided in the screw bag) on the end cap opposite the on/off switch. Install plastic insert in arm slot not being used.
11. Install the entire cover assembly and the spindle insert with the screws provided.
12. Minimum door width for a push arm is 36 inches.

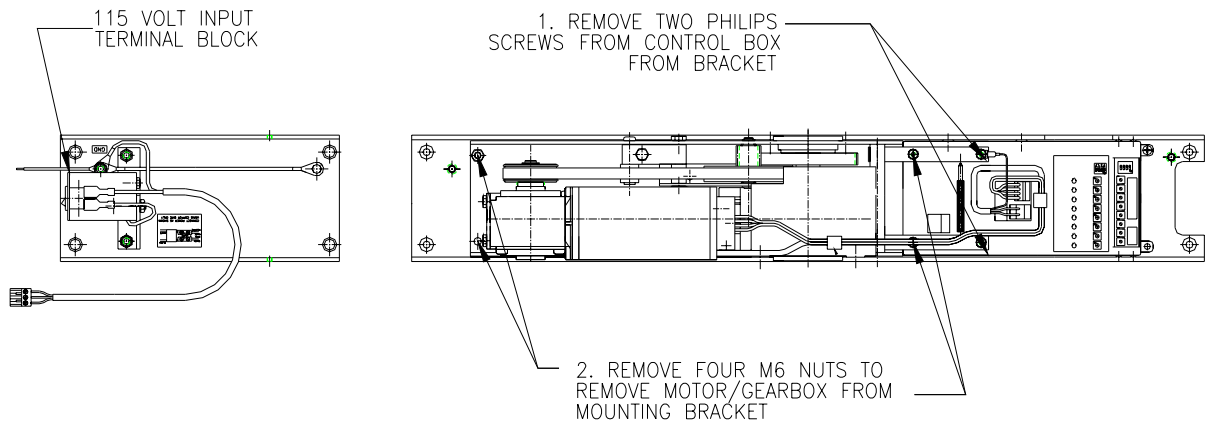
**Full Length Pull Arm**



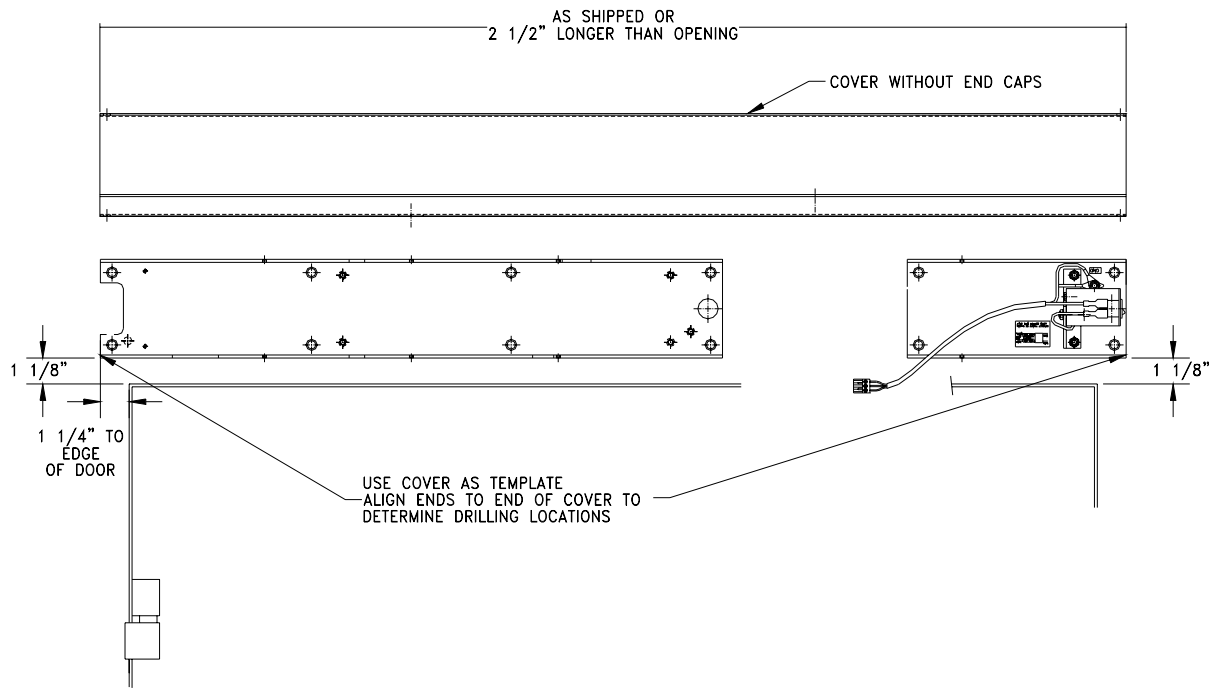
**FIGURE 14: SYSTEM COMPONENTS – PULL ARM**



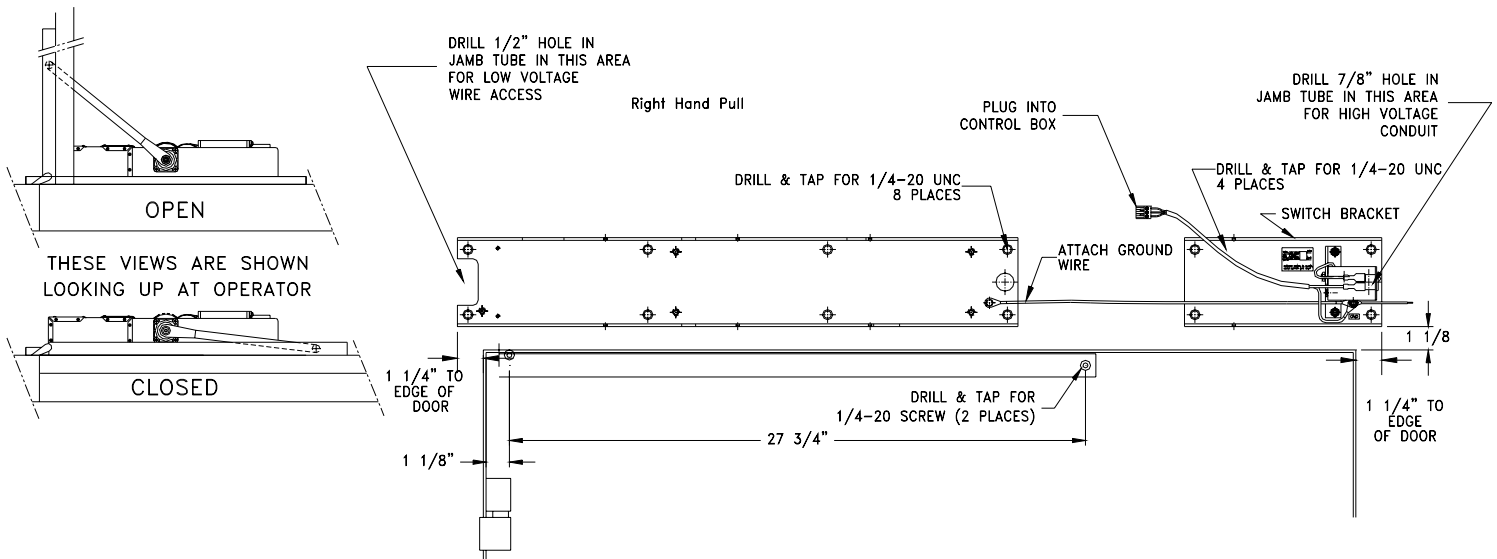
**FIGURE 15: OPERATOR CLEARANCES – PULL ARM**



**FIGURE 16: MOTOR/GEARBOX & CONTROL BOX REMOVAL**



**FIGURE 17: CENTERING OPERATOR OVER OPENING**

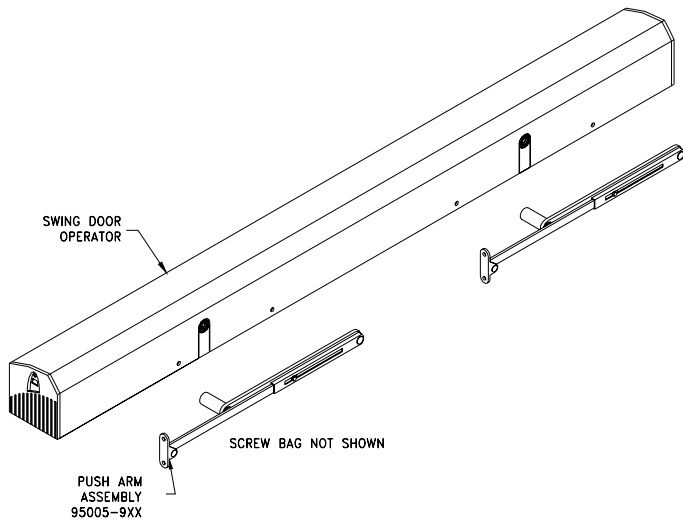


**FIGURE 18: OPERATOR INSTALLATION - PULL ARM**

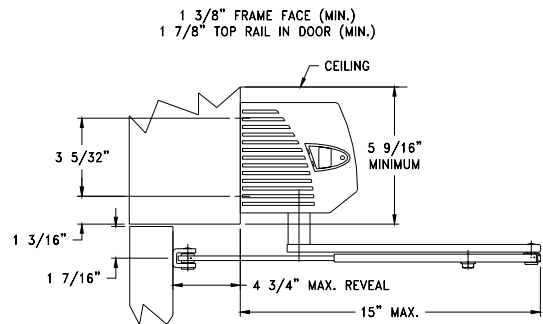
Installation and Arm Adjustment Notes:

1. Remove the control box and motor/gearbox from the mounting bracket (**Figure 16**).
2. Center operator over opening (**Figure 17**).
3. Mounting bracket must be installed with the thread studs away from the hinge to ensure correct operator orientation. Mount switch bracket as shown (**Figure 18**).
4. After installing the mounting bracket on the header or frame, install the motor/gearbox onto the studs with the 4 nuts provided and then install the control box onto the mounting bracket with the 2 flat head screws provided.
5. For opposite side door, view will mirror **Figure 18**.
6. Push the 4 prong green plug into the green corresponding socket, push the 2 prong green plug into the corresponding green socket and the 3 prong green plug into the socket marked "main, ground, neutral" located on the mounting screw side of the control box.
7. Connect power to the terminal block (**Figure 16**), matching black to black (live), white to white (neutral), and ground to the grounding stud.
8. Connect all activation devices in parallel to the "Inside Activate" and connect all outside activation devices in parallel to the "Outside Activation" terminal (**Figure 25 for Standard, 26 for Premium**).
9. Before attaching the arm to the unit, activate the operator to the full open position by placing a jumper wire across the "Inside Activation" terminals to put the operator in the hold open position. Attach the track to the door. Attach the arm to the operator with the 8mm socket head screw (loosely) and adjust the arm to the desired door position together with the track. Once the desired position has been chosen, tighten the 8mm socket head screw. Remove the jumper wire.
10. Snap the end caps into the cover and secure with the (2) #6 round head screws provided. Snap in the optional end cap insert (provided in the screw bag) on the end cap opposite the on/off switch. Install plastic insert into arm slot not being used.
11. Install the entire cover assembly and the spindle insert with the screws provided.
12. Minimum door width for a pull arm is 36 inches.

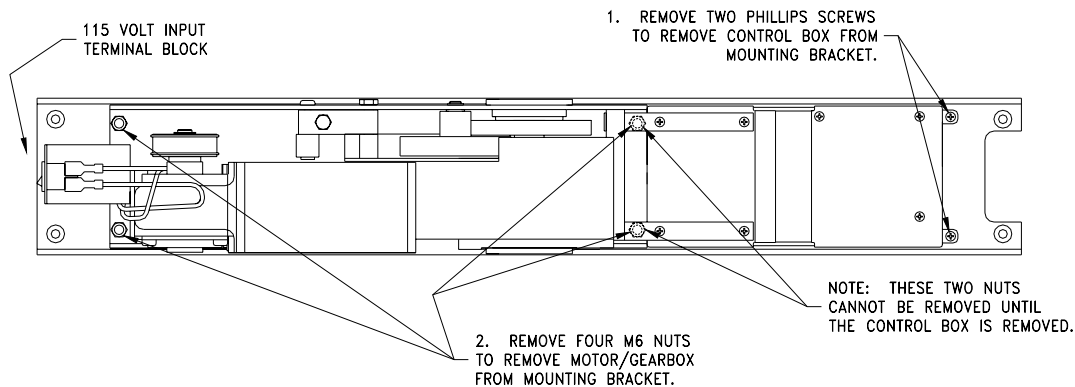
## Double Push Arm



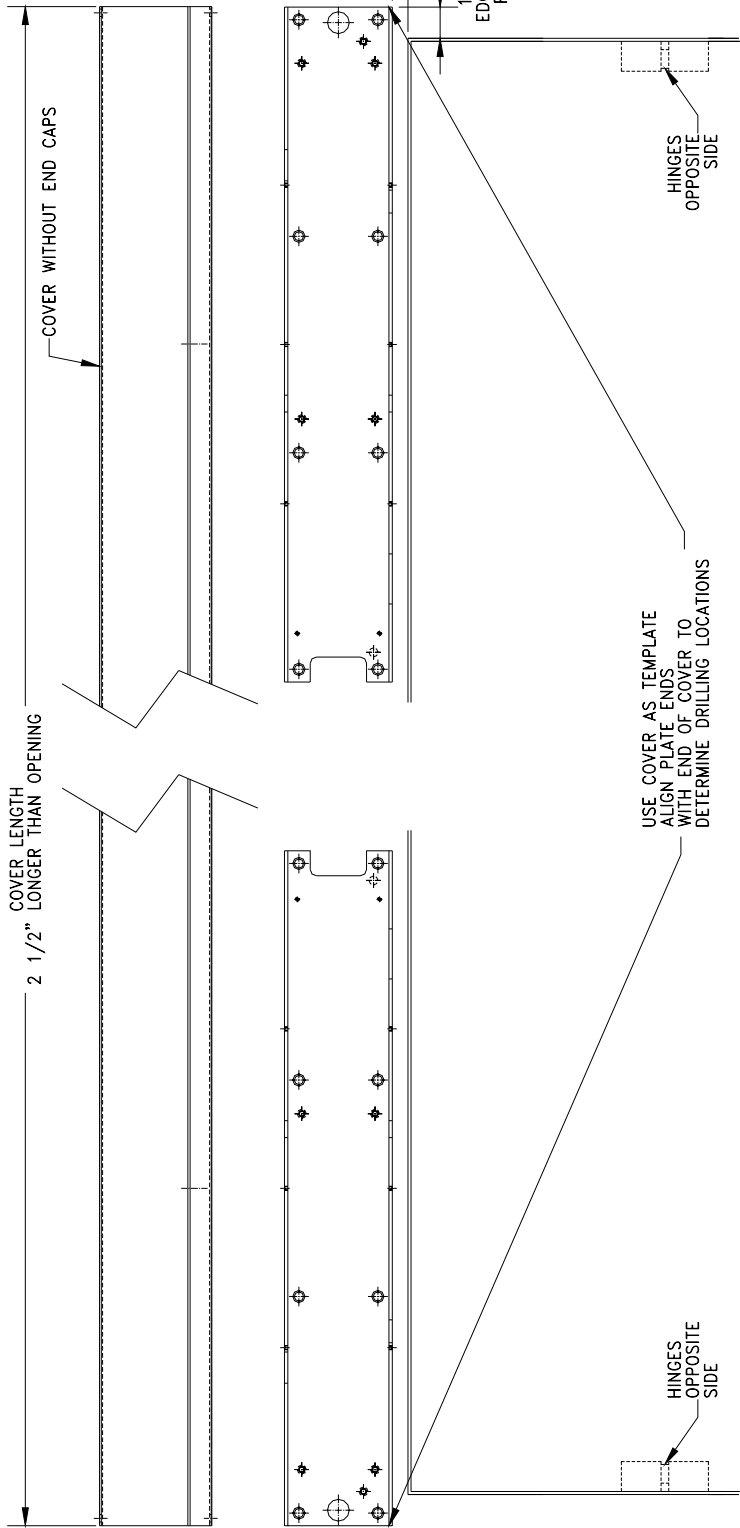
**FIGURE 19: SYSTEM COMPONENTS – DOUBLE PUSH ARM**



**FIGURE 20: OPERATOR CLEARANCES-PUSH ARM**

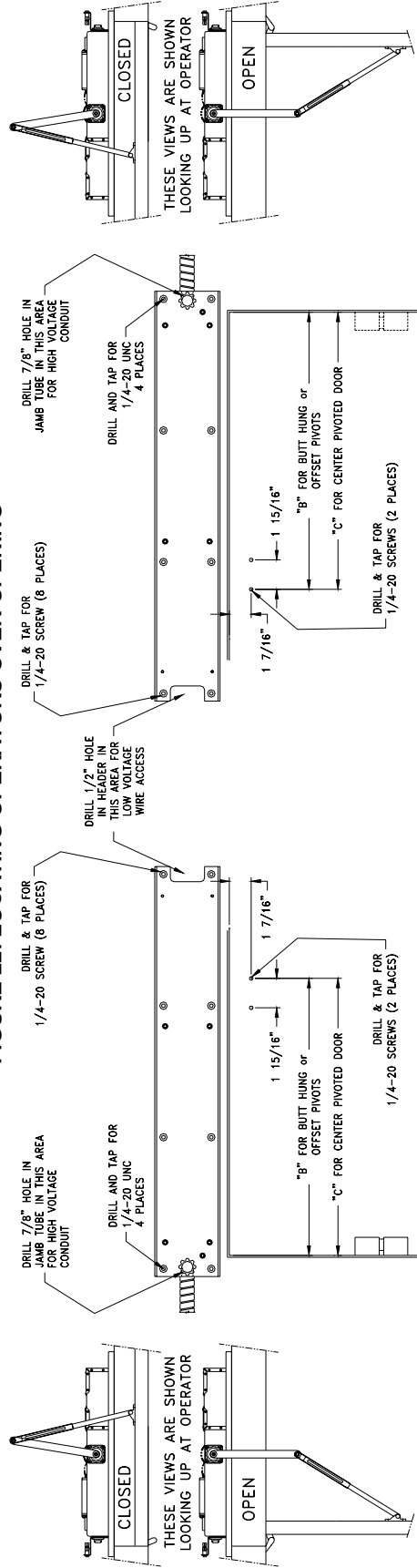


**FIGURE 21: MOTOR/GEARBOX & CONTROL BOX REMOVAL**



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

**FIGURE 22: LOCATING OPERATORS OVER OPENING**

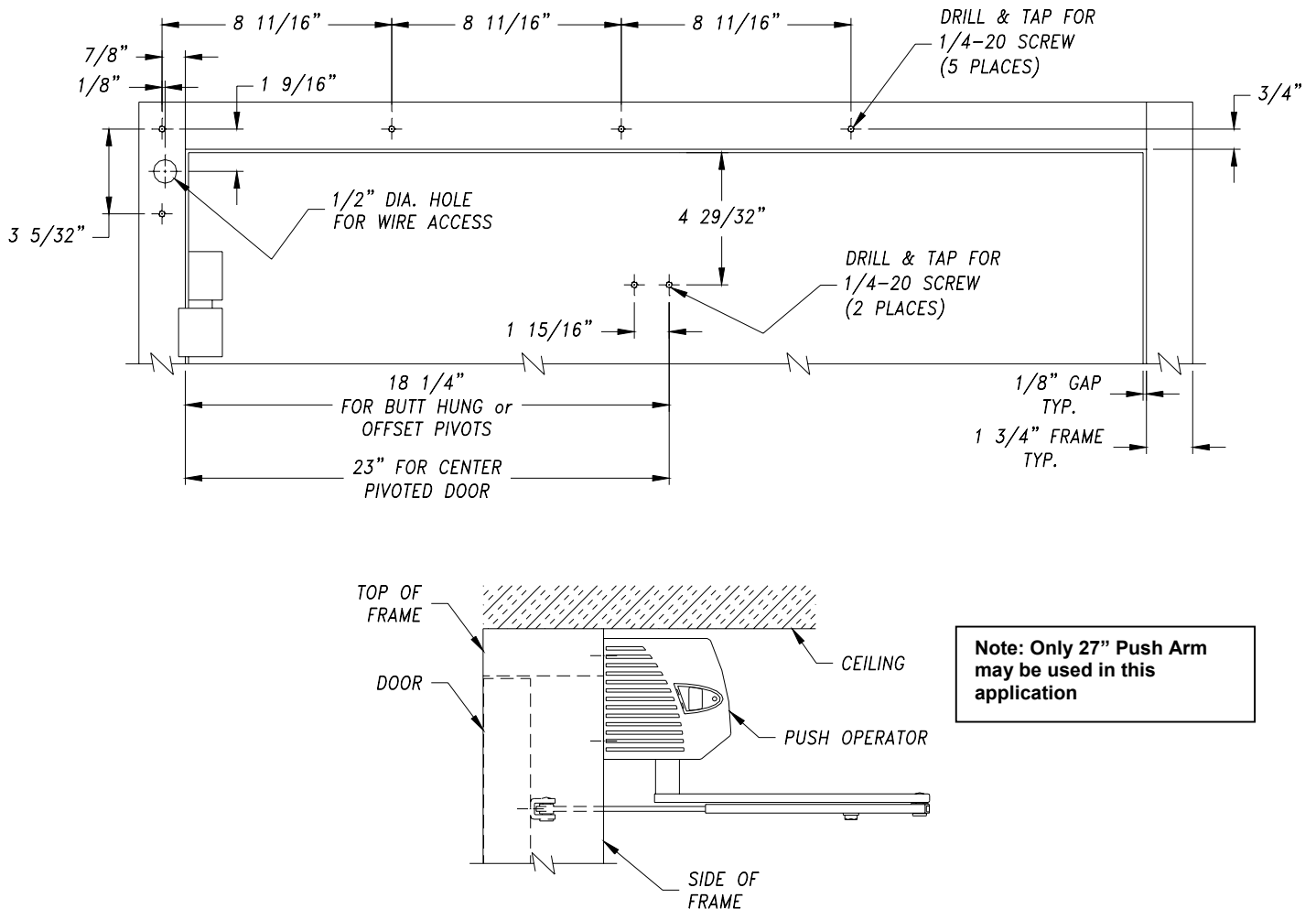


**FIGURE 23: OPERATOR INSTALLATION- DOUBLE PUSH ARM**

Installation and Arm Adjustment Notes:

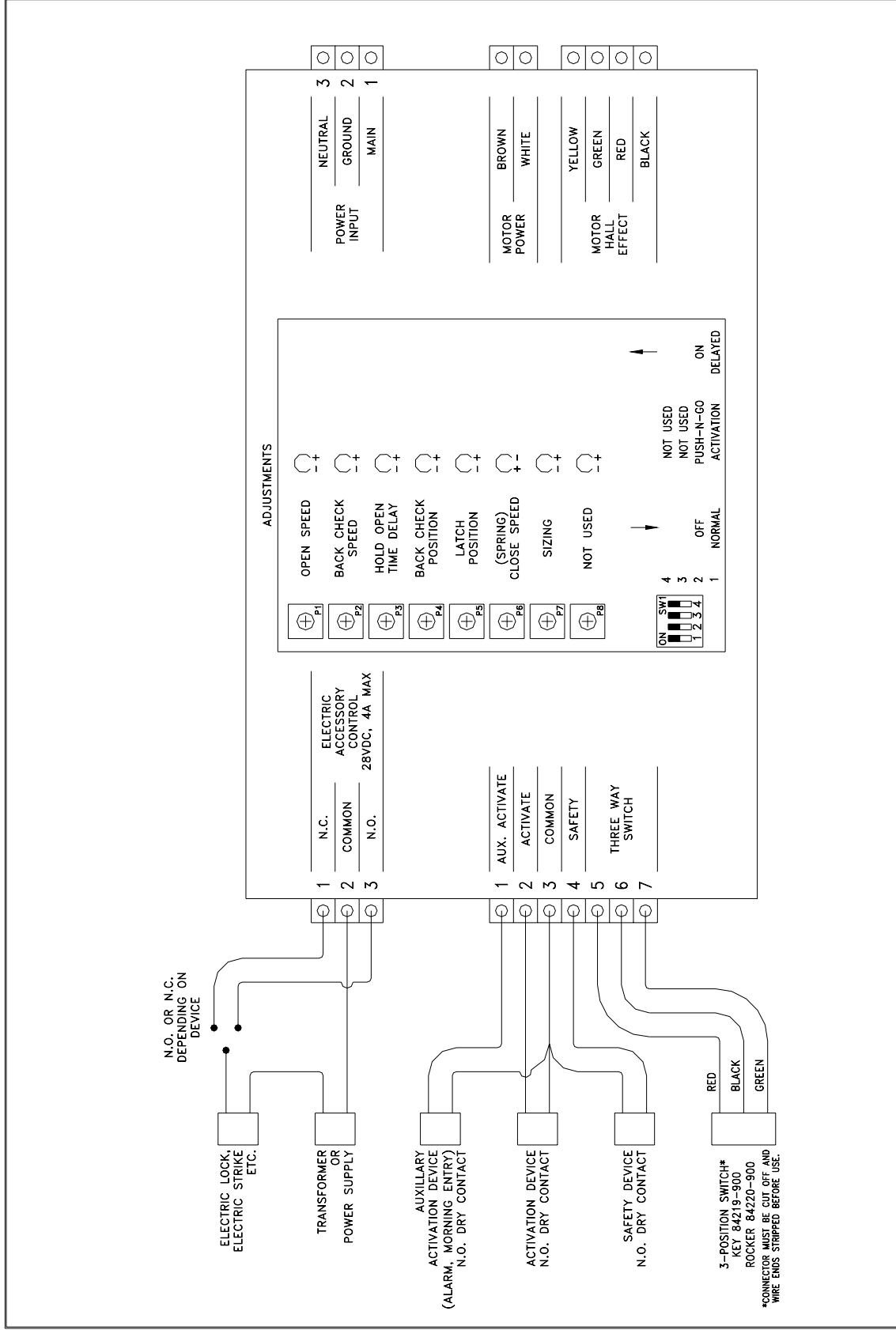
1. Remove the control boxes and motor/gearboxes from the mounting brackets (**Figure 21**).
2. Mounting brackets must be installed with the thread studs near the hinges to ensure correct operator orientation.
3. After installing the mounting brackets on the header or frame, install the motor/gearbox onto the studs with the 4 nuts provided and then install the control box onto the mounting bracket with the 2 flat head screws provided.
4. Push the 4 prong green plug into the green socket, push the 2 prong green plug into the corresponding green socket, attach ground wire plug, and the 3 prong green plug into the socket marked "main, ground, neutral" located on the mounting screw side of the control box.
5. Connect power to the terminal block (**Figure 21**), matching black to black (live), white to white (neutral), and ground to the grounding stud.
6. Connect all activation devices in parallel to the "Inside Activate" and connect all outside activation devices in parallel to the "Outside Activation" terminal (**Figure 25 for Standard, 26 for Premium**).
7. Before attaching the arm to the unit, activate the operator to the full open position by placing a jumper wire across the "Inside Activation" terminals to put the operator in the hold open position. Attach the shoe to the door. Attach the arm to the operator with the 8mm socket head screw (loosely) and adjust the arm to the desired door position together with the shoe. Once the desired position has been chosen, tighten both the 8mm socket head screw and the nut connecting the two parts of the arm. Remove the jumper wire.
8. Snap the end caps into the cover and secure with the (2) #6 round head screws provided. Snap in the optional end cap insert (provided in the screw bag) on the end cap opposite the on/off switch. Install the entire cover assembly and the spindle insert with the screws provided.

### Low Ceiling Application



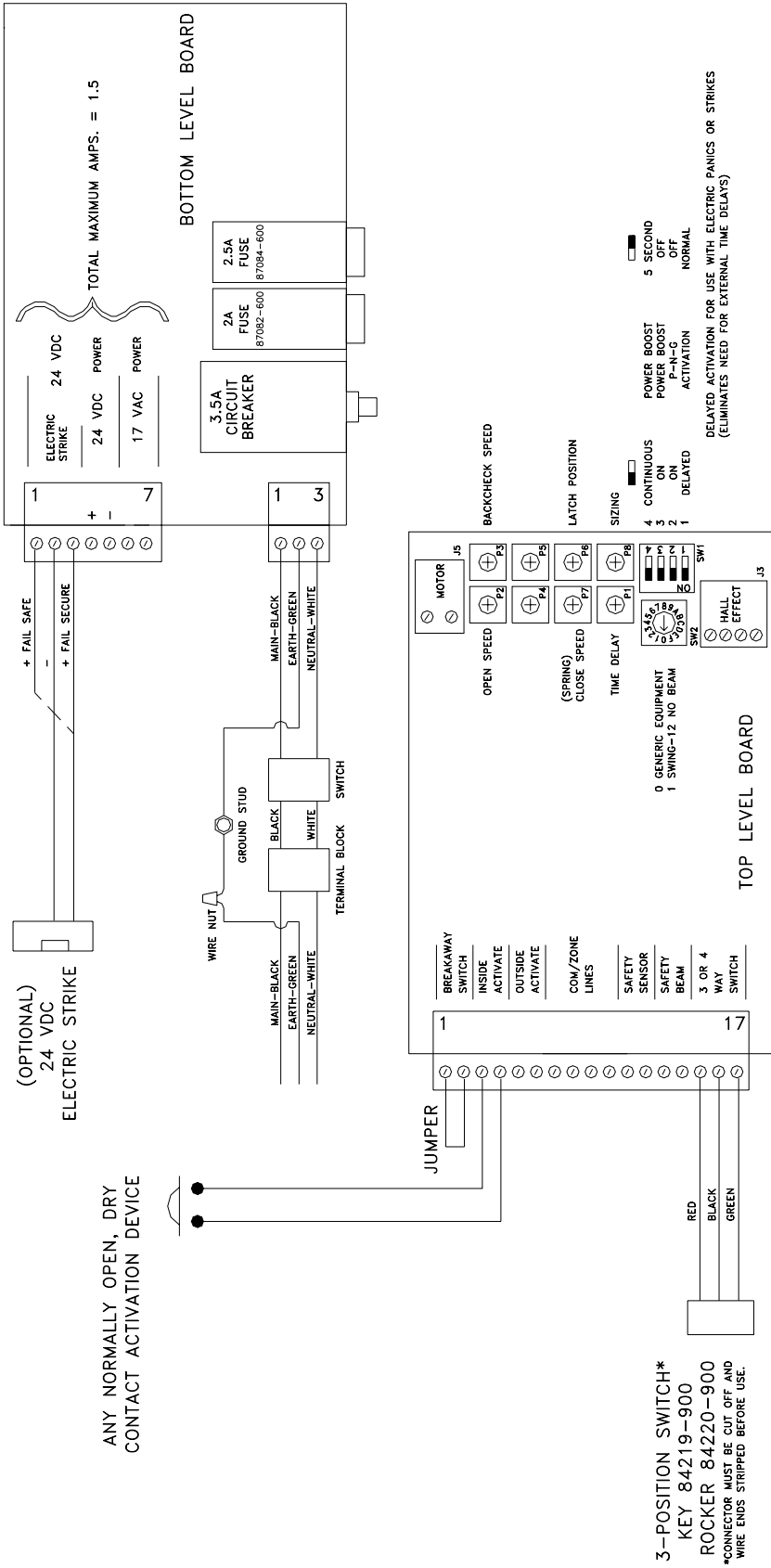
**FIGURE 24: INSTALLATION TEMPLATE FOR LOW CEILING APPLICATION – PUSH ARM ONLY**

# Standard Control Box



**FIGURE 25: STANDARD CONTROL BOX WIRING**

# SWING DOOR OPERATOR CONTROL (LOW ENERGY)



- P2: OPEN SPEED ADJUSTMENT. CW=SLOWER CCW=FASTER
- P3: BACKCHECK SPEED ADJUSTMENT. CW=SLOWER CCW=FASTER
- DO NOT ADJUST THIS TO MAXIMUM SETTING. ADJUST AS NEEDED ONLY TO OVERCOME SPRING TENSION.
- P4: NOT USED IN THIS VERSION.
- P5: NOT USED IN THIS VERSION.
- P7: (SPRING) CLOSE SPEED ADJUSTMENT. CW=SLOWER CCW=FASTER
- P6: LATCH POSITION ADJUSTMENT. CW=LESS LATCH CCW=MORE LATCH
- P1: TIME DELAY ADJUSTMENT. CW=LESS HOLD OPEN TIME CCW=MORE HOLD OPEN TIME
- P8: SIZING ADJUSTMENT. DO NOT ADJUST UNLESS SPRING IS SET TO HIGH TENSION POSITION. ADJUST AS NEEDED ONLY TO OVERCOME SPRING TENSION.
- SW2: FUNCTION SELECTOR SWITCH. 0=GENERIC EQUIPMENT 1=SWING-12 NO BEAM

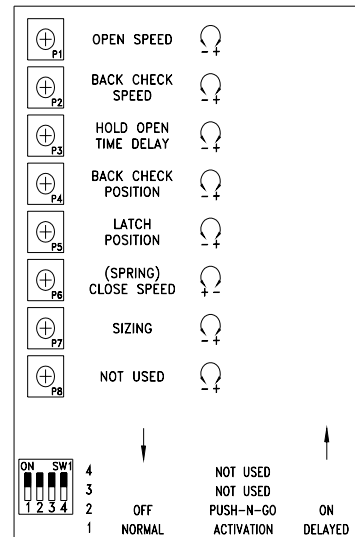
FIGURE 26: PREMIUM CONTROL BOX WIRING

# Troubleshooting

If door does not open at all, ensure door is not locked and power is on. If door is unlocked and power switch is on, check fuse(s), circuit breaker, and connections. Use the following procedure.

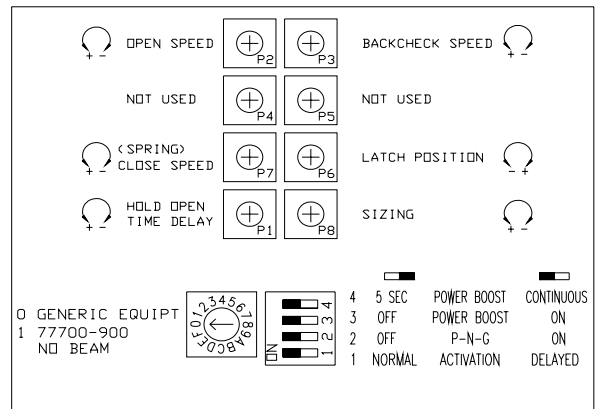
## 1. Standard Control Box.

- A. Adjust the pots to settings below. These are single turn pots.
  - P1 (Open Speed)= 100% (Clockwise)
  - P2 (Back Check Speed)= 100% (Clockwise)
  - P3 (Hold Open Time Delay)= 0% (Counter-Clockwise)
  - P4 (Back Check Position)= 50%  
(Turn Counter-Clockwise until pot stops. Turn Clockwise one half turn.)
  - P5 (Latch Position)= 100% (Clockwise)
  - P6 (Close Speed)= 100% (Clockwise)
  - P7 (Sizing)= 100% (Clockwise)
  - P8= Not Applicable
- B. Activate door to test operation.
- C. Adjust Control Box settings as needed.



## 2. Premium Control Box

- A. Adjust the pots to settings below. These are single turn pots.
  - P1 (Hold Open Time Delay)= 0% (Clockwise)
  - P2 (Open Speed)= 100% (Counter-Clockwise)
  - P3 (Back Check Speed)= 100% (Counter-Clockwise)
  - P4= Not Applicable
  - P5= Not Applicable
  - P6 (Latch Position)= 50%  
(Turn Counter-Clockwise until pot stops. Turn Clockwise one half turn.)
  - P7 (Close Speed)= 100% (**Clockwise**)
  - P8 (Sizing)= 100% (Counter-Clockwise)
- B. Activate door to test operation.
- C. Adjust Control Box settings as needed.



The pots must be adjusted for the specific application to meet the Americans with Disabilities Act, ANSI 156.19-1997, and local codes.