



# **DOR-O-MATIC™**

## **INGERSOLL-RAND**

### **ARCHITECTURAL HARDWARE**

# **Benchmark™ Swing Operator**

**99100-9XX with Push Arm**  
**99105-9XX with Pull Arm**

## **Installation Instructions/Owners Manual**

### **DOR - O - MATIC™**

7350 W. Wilson Ave.  
Harwood Heights, IL 60706

Toll Free: 1-800-543-4635  
In Illinois: 708-867-7400  
Sales FAX: 708-867-0291  
Engineering FAX: 708-867-1177  
[www.doromatic.com](http://www.doromatic.com)

## 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).

## 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).
- 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).
- 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
- J. Only a push arm can be used in a low ceiling application (Figure 9).

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

## INSTALLATION

### 1. Preparation:

A 115 volt, single phase, 60Hz, fused, 15 amp, 3-wire power supply must be brought to the hinge 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 hinge side jamb (Figures 4 & 8). 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 10) connect power and accessories as needed.
- B. 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 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 (CW=FASTER, CCW=SLOWER). 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 Adjustments:

The back check speed is controlled by rotating P2 (CW=FASTER, CCW=SLOWER).

#### C. Hold Open Time Delay Adjustment:

Adjustment is made by rotating P3 (CW=MORE HOLD OPEN TIME, CCW=LESS HOLD OPEN TIME). The total adjustment range on the control box is 1 to 30 seconds of time delay.

#### D. Back Check Position:

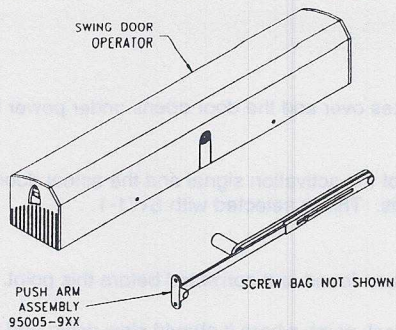
Adjustment is made by rotating P4 (CW=MORE BACK CHECK, CCW=LESS BACK CHECK).

- E. **Latch Position:**  
By rotating P5, one can vary the position at which latch occurs (CW=MORE LATCH, CCW=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).
  - G. **Latch Speed:**  
Latch speed is factory set and has no adjustment.
  - H. **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.
  - I. **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.
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.

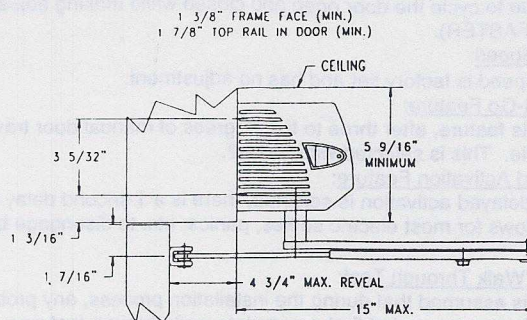
### DO'S AND DON'TS

1. **Do Not** try to use this operator on large, heavy doors without checking with the factory first.
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** attempt to use a fuse larger than specified.
4. **Do Not** attempt to modify the factory wiring or connect any wiring into an existing electrical circuit or any other electrical device.
5. **Do Not** attempt to 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** also 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

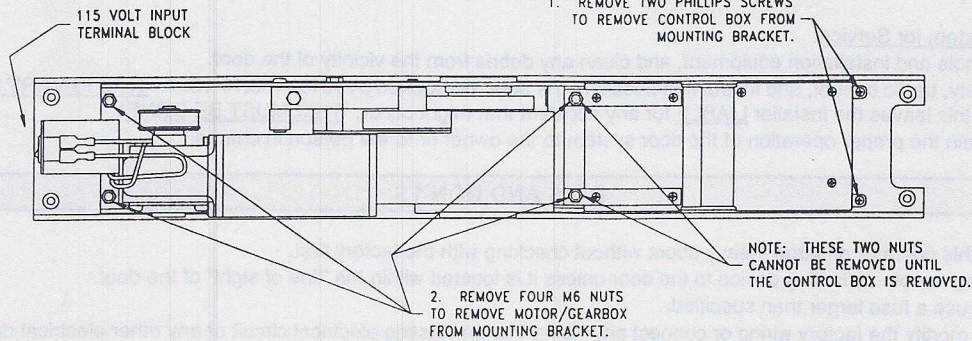
## PUSH ARM DIAGRAMS



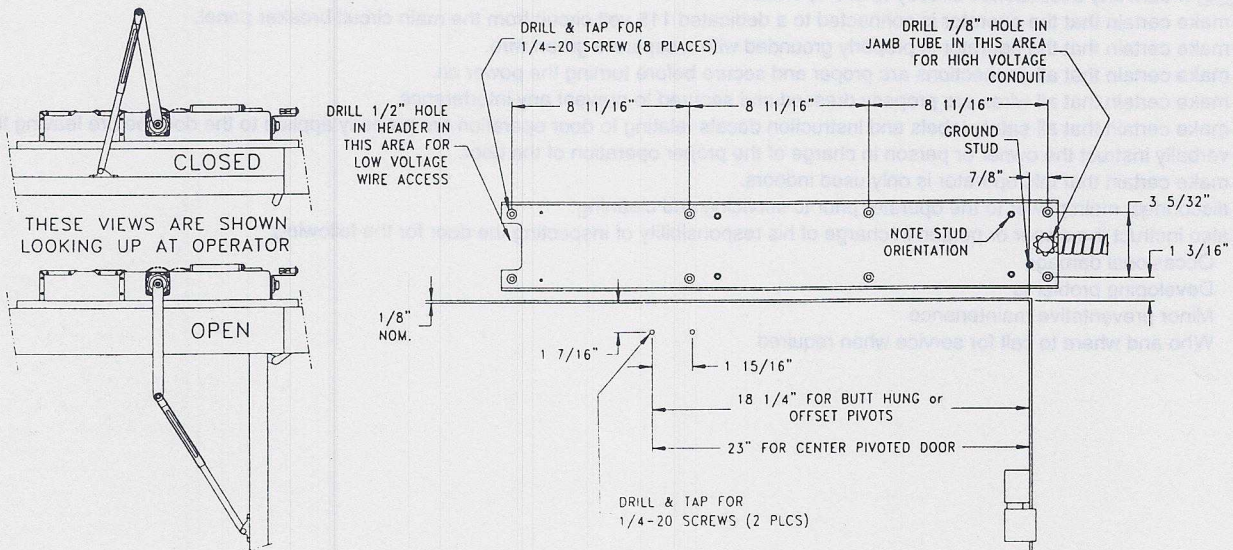
**FIGURE 1: SYSTEM COMPONENTS – PUSH ARM**



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



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

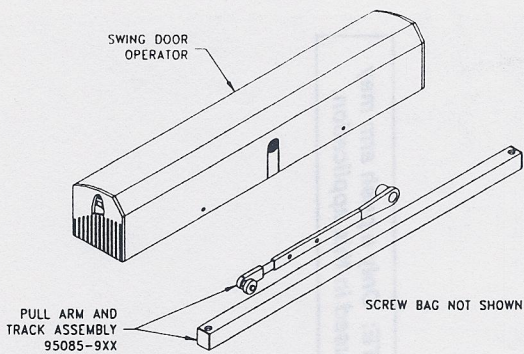


**FIGURE 4: OPERATOR INSTALLATION – PUSH ARM**

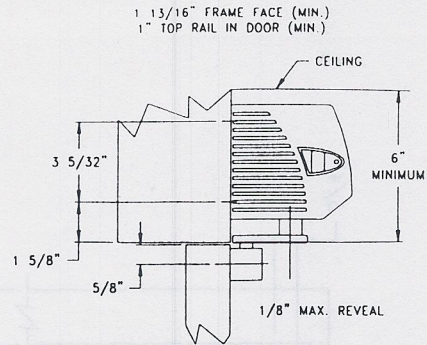
**Installation and Arm Adjustment Notes:**

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 10).
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.

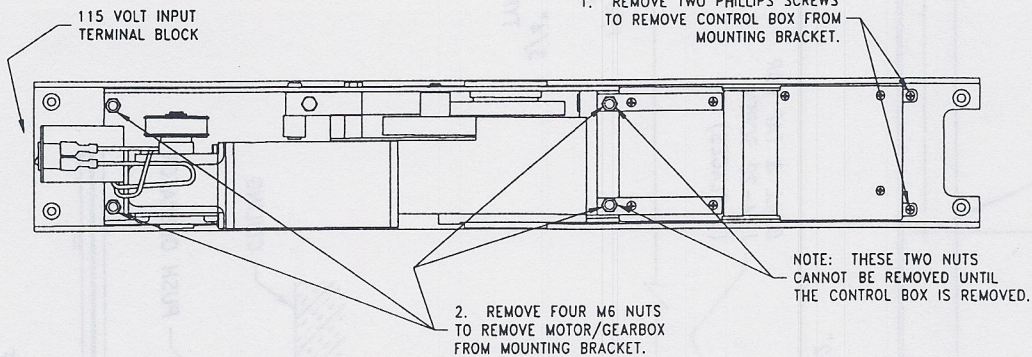
# PULL ARM DIAGRAMS



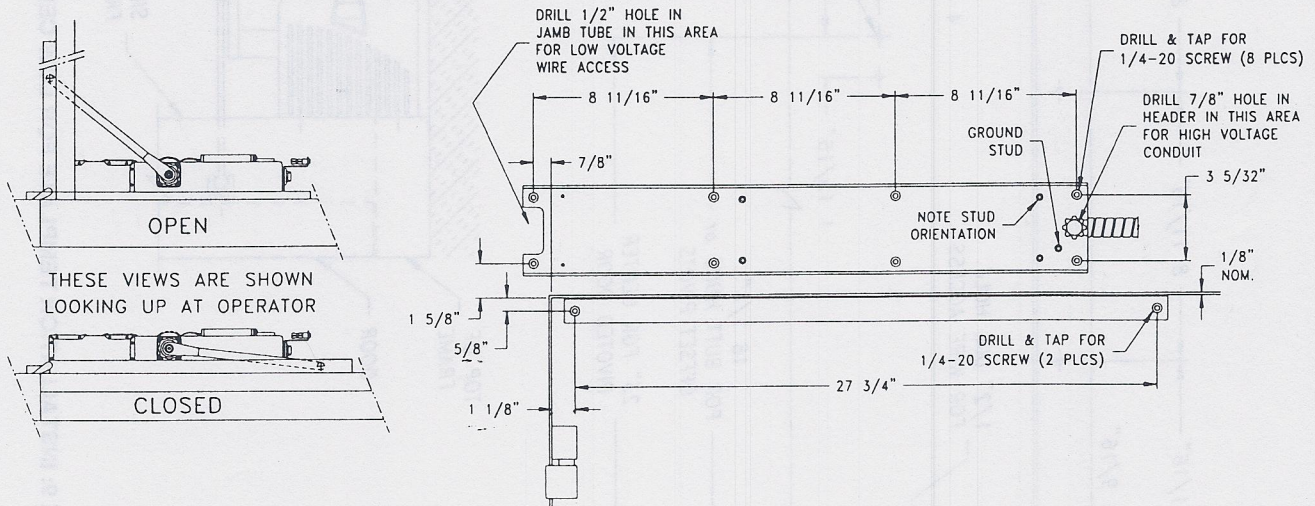
**FIGURE 5: SYSTEM COMPONENTS – PULL ARM**



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



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

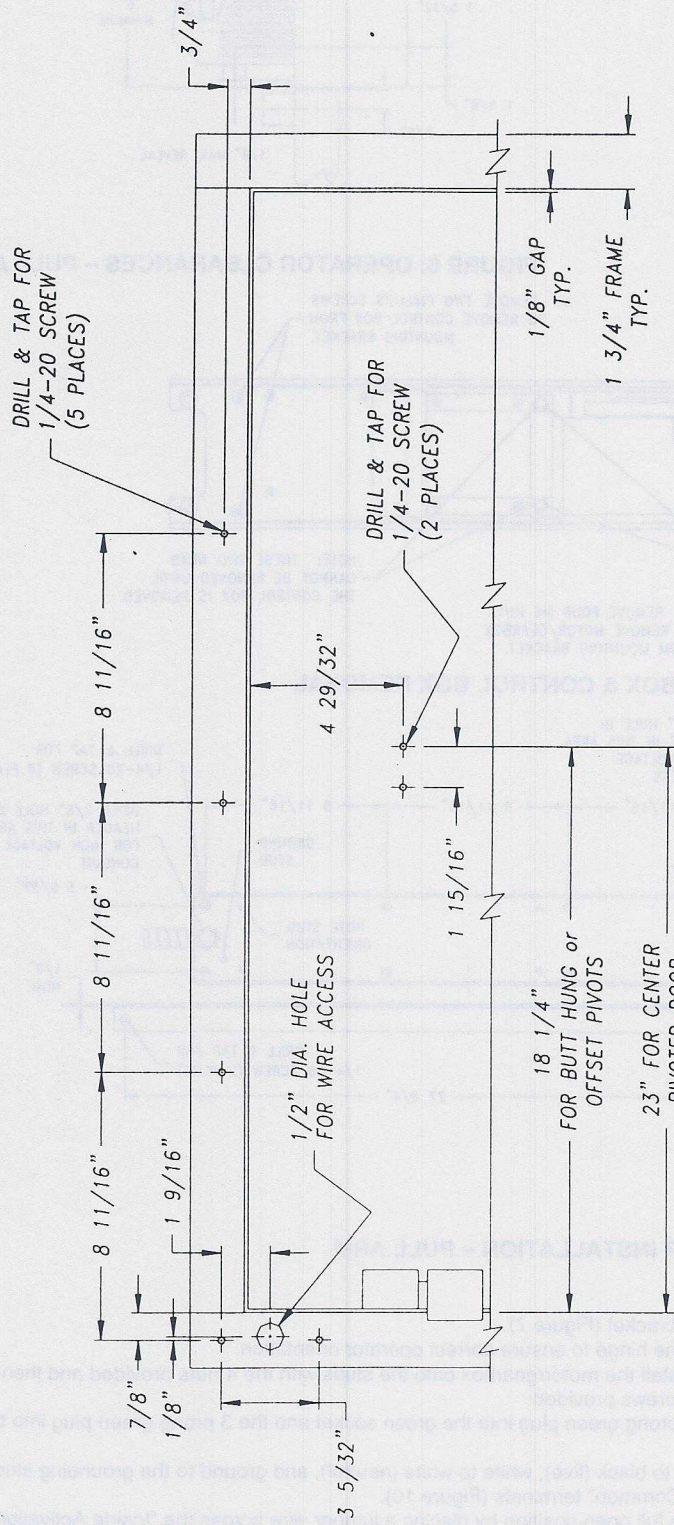


**FIGURE 8: OPERATOR INSTALLATION – PULL ARM**

**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 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 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 10).
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.

INSTALLATION TEMPLATE FOR LOW CEILING APPLICATION – PUSH ARM ONLY



**NOTE: Only a push arm may be used in this application.**

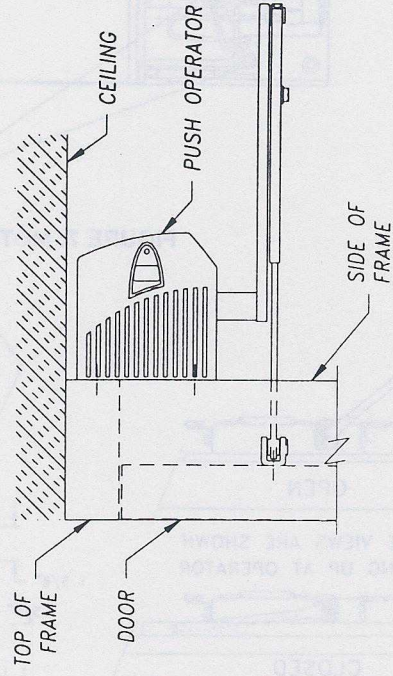


FIGURE 9: INSTALLATION TEMPLATE FOR LOW CEILING APPLICATION – PUSH ARM ONLY

WIRING DIAGRAM

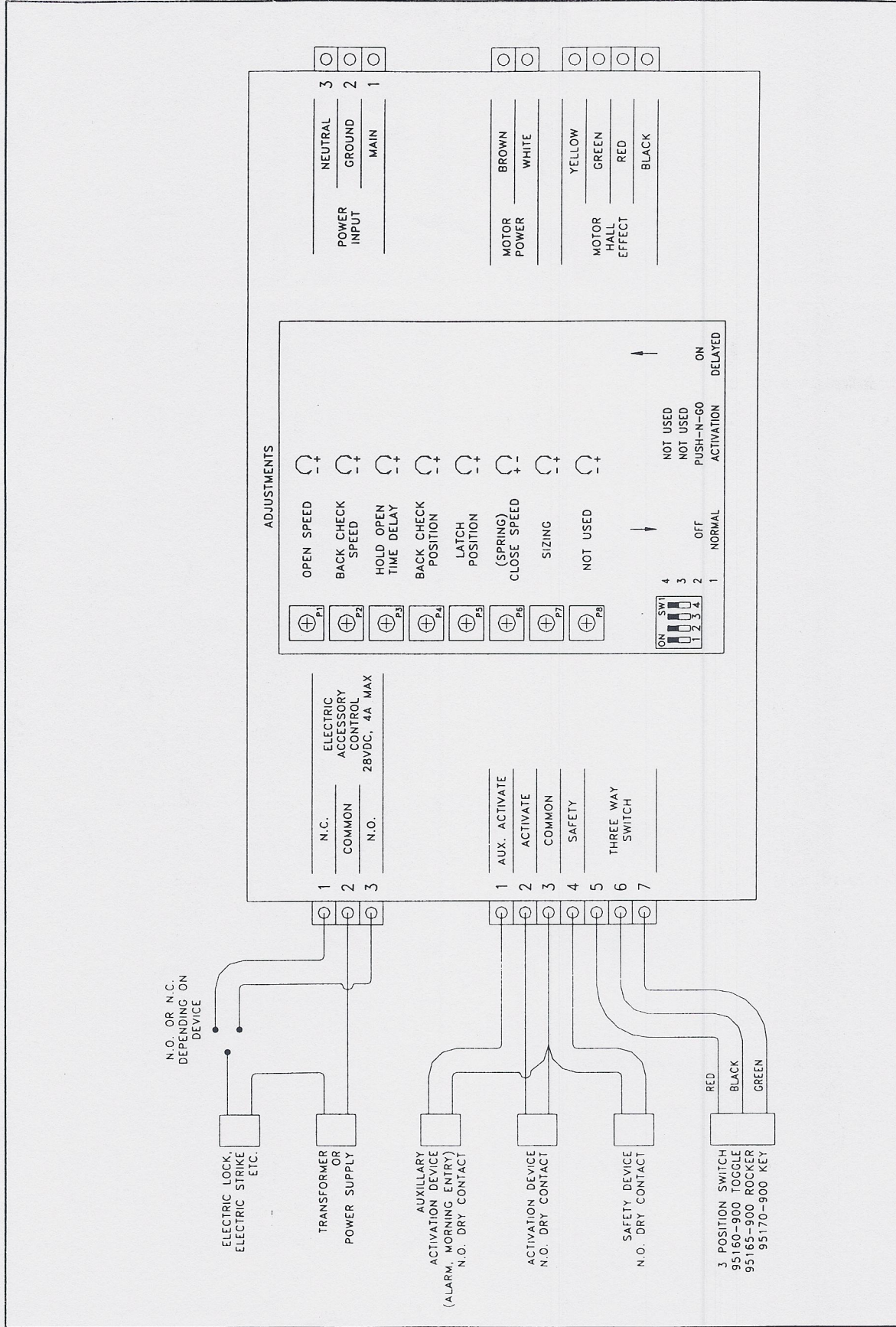


FIGURE 10: CONTROL BOX WIRING

FIGURE 16. CONTROL BOX WIRING

