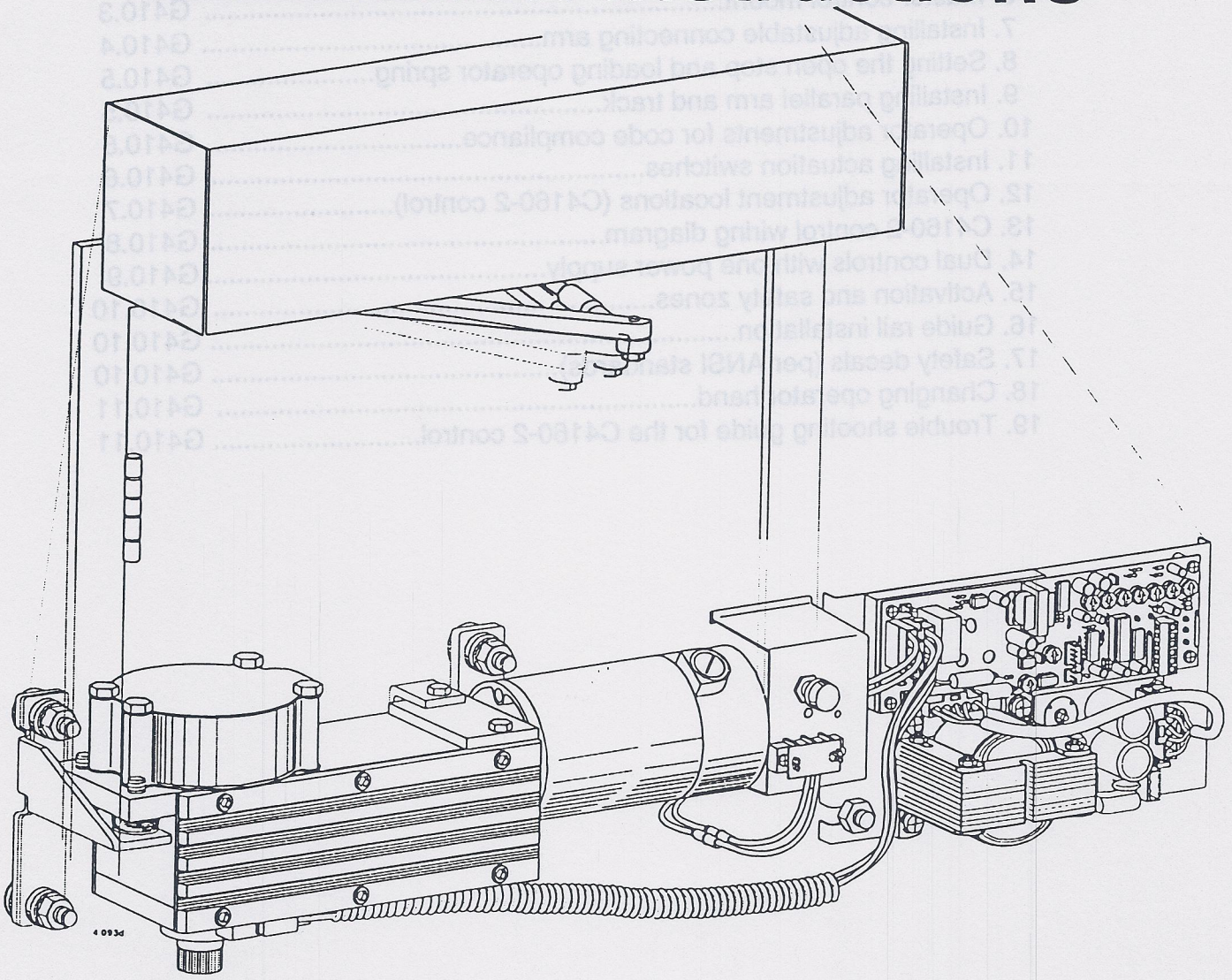
Series 4100

Swing Door Operator

with C-4160-2 Controls

Installation Instructions



Horton
AUTOMATICS

G410, SEPT. 98
REV. FEB. 99

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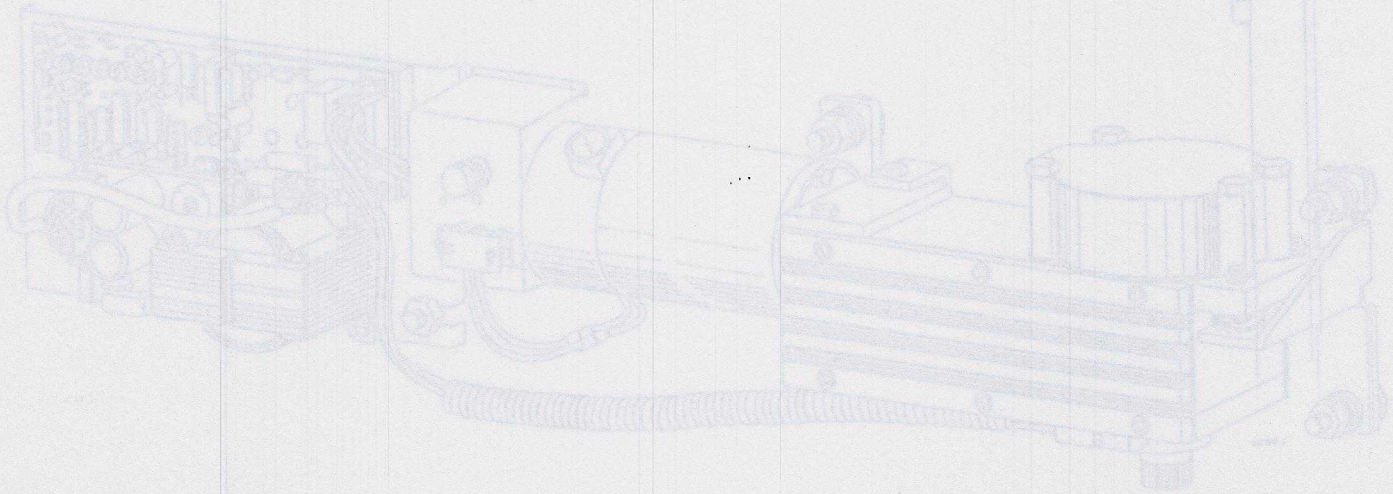


1. INSTRUCTIONS TO INSTALLER

- This door is to be installed by a trained and experienced installer AAADM certified with knowledge of local codes and ANSI A156.10 standards for power operated doors.
- To ensure safe and proper operation, the door must be installed and adjusted to conform to Horton Automatics recommendations, all code requirements and ANSI A156.10.
- If there are any questions about these instructions, call Horton Automatics Technical Assistance.

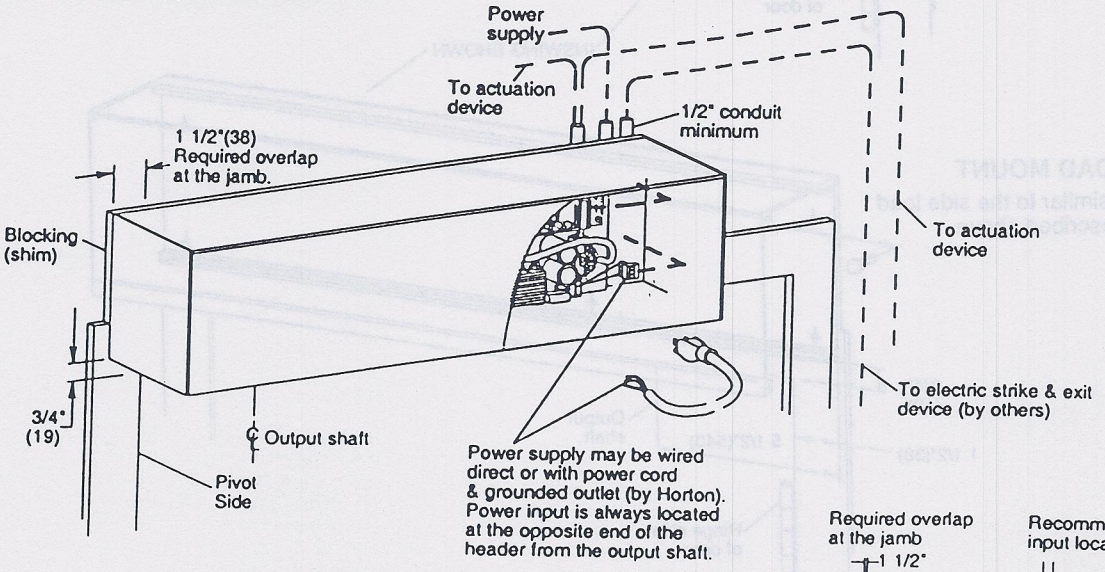
INFORMATION TO BE PROVIDED BY THE DISTRIBUTOR TO THE OWNER

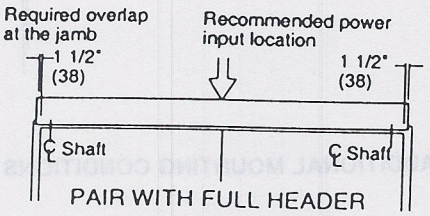
- After installation instruct the owner on the safe operation of the door.
- Present the Owner's Manual M310 and explain how to perform the Daily Safety Check.
- Location of power on / off switch.
- Necessary warnings not covered in these general instructions.
- Date equipment shipped from Horton Automatics.
- Date equipment placed in service.
- Horton Automatics' invoice number for warranty reference.
- Equipment type.
- Accessories included.
- Phone number to call regarding problems or request for service.

- **Give caution to owner:** if a potentially hazardous situation is suspected, the door should be taken out of automatic service until a professional inspection is made and the problem is corrected.

2. GENERAL REQUIREMENTS

- Power 120 VAC, 60 Hz.,15 AMP in conduit. Non-North American voltage can be 240VAC, if so, be sure the operator has a 240VAC power supply.
- Actuation wiring (22Ga. 2 wire) in conduit.
- Confirm header length before running conduit (header length may be less than door width).
- Adequate support for header.

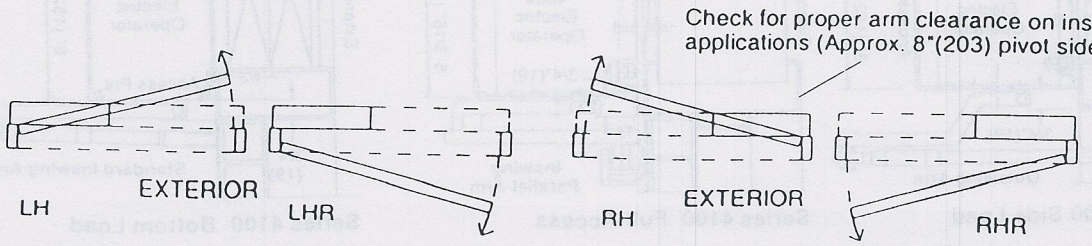




NOTE:
- If this is a 4100 LE see ANSI 156.19 for guide lines on handicap operation and switching.
- Refer to section 16 for required decals.

3. OPERATOR HANDING

Confirm handing of door before installing operator. Refer to section 17 for instructions if changing hand of operator is required.



4.HEADER INSTALLATION - SURFACE APPLIED SERIES 4100

The unit is shipped from the factory with the operator and controls installed. These should be removed for header installation.

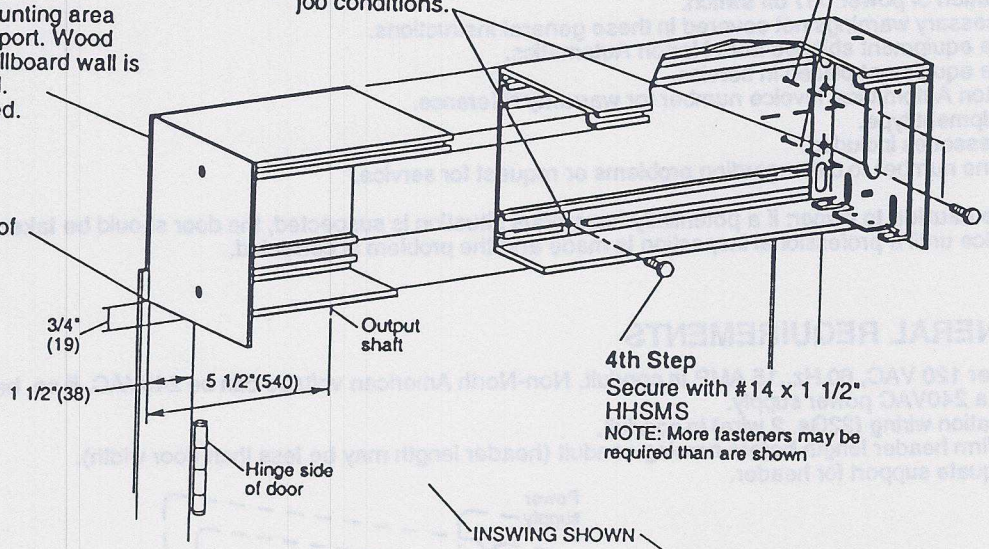
SIDE LOAD MOUNT (FULL ACCESS SIMILAR)

1st Step
Check the mounting area for proper support. Wood blocking in wallboard wall is recommended. Shim if required.

2nd Step
Mark location of header mount.

3rd Step
Drill all holes #7 (.201) through backmember & frame. Drill "F" (.257) clearance holes through backmember only. Hole locations will vary as per job conditions.

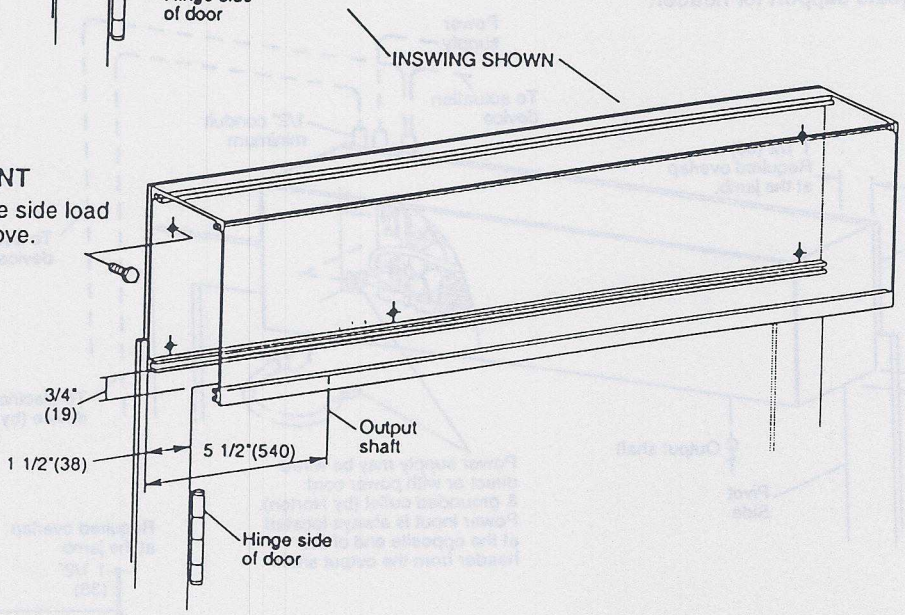
5th Step
Pull power and actuation wires into header.



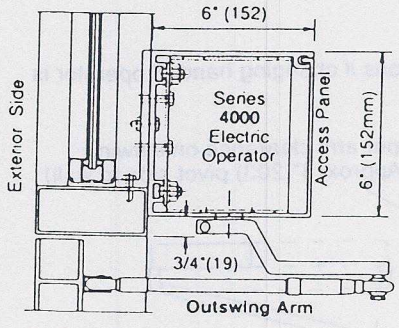
4th Step
Secure with #14 x 1 1/2" HHSMS
NOTE: More fasteners may be required than are shown

BOTTOM LOAD MOUNT

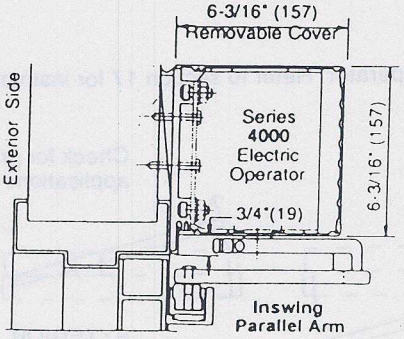
Installation is similar to the side load instructions described above.



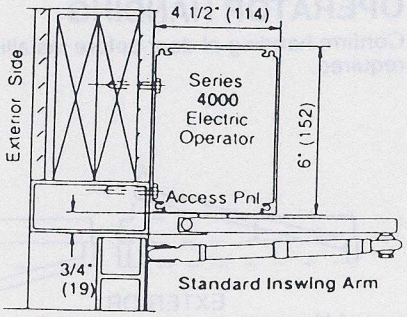
ADDITIONAL MOUNTING CONDITIONS



Series 4100 Side Load



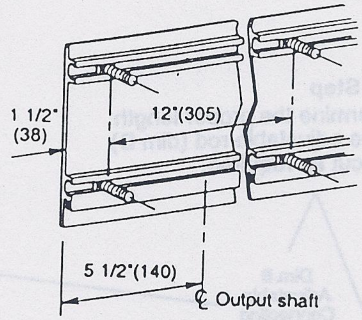
Series 4100 Full Access



Series 4100 Bottom Load

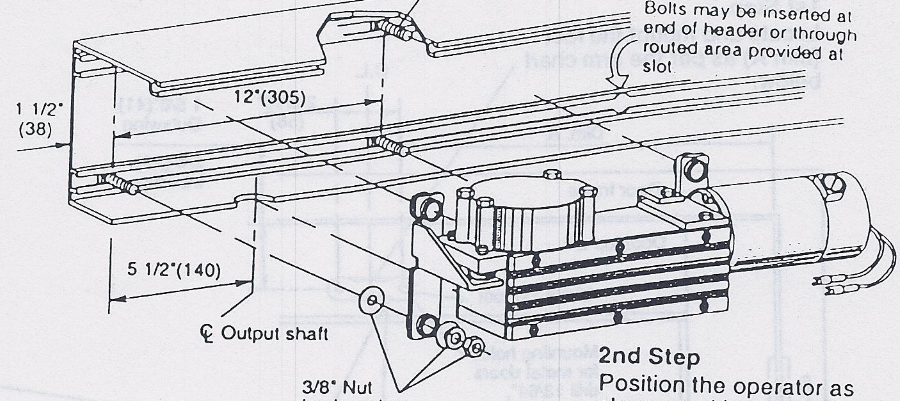
5. OPERATOR INSTALLATION

FULL ACCESS

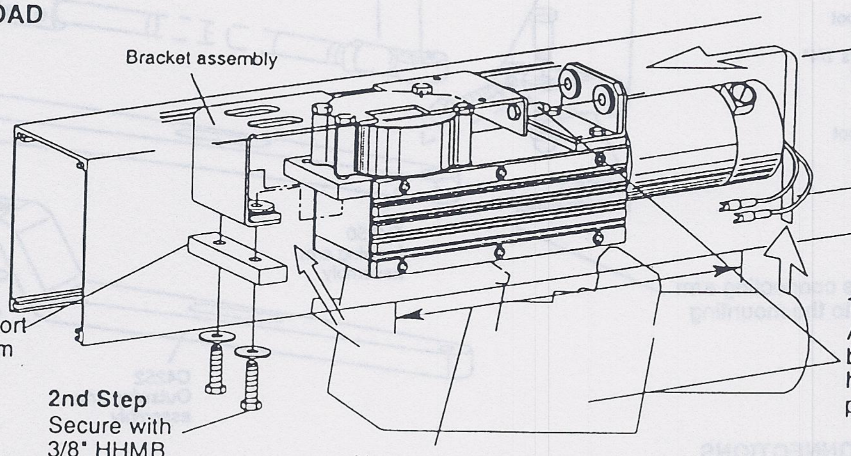


Full access operator installation same as sideload

SIDELOAD

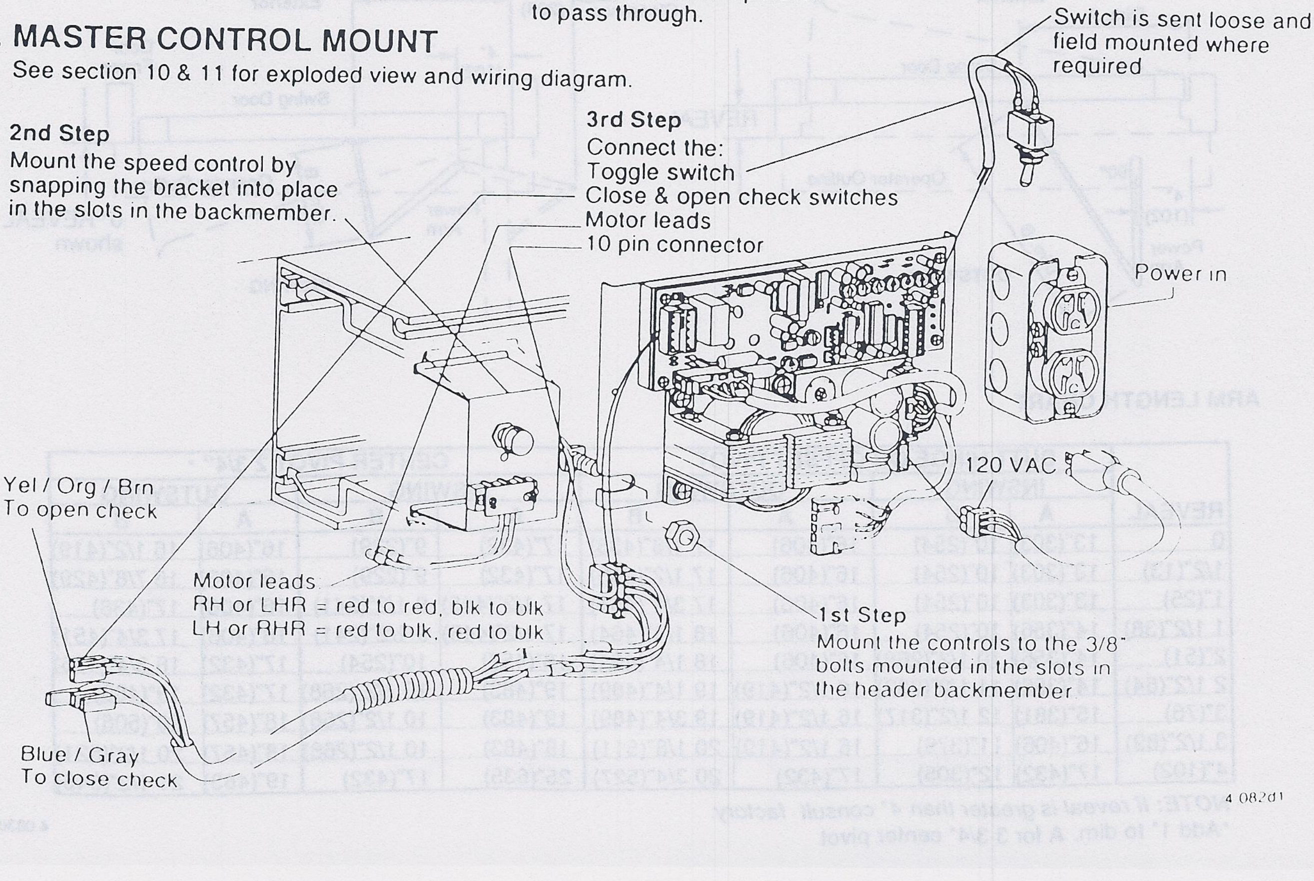


BOTTOM LOAD



6. MASTER CONTROL MOUNT

See section 10 & 11 for exploded view and wiring diagram.



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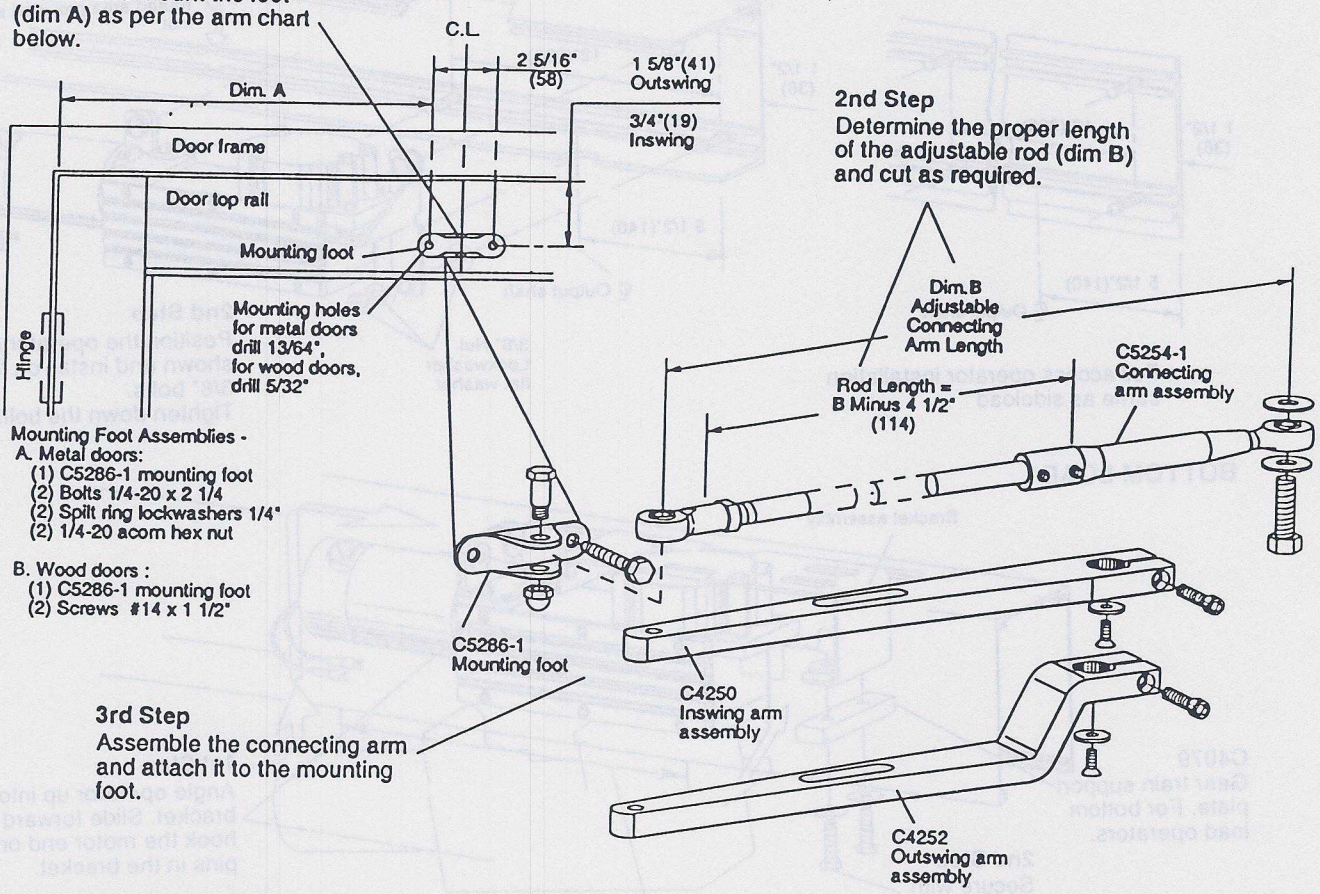
7. INSTALLING ADJUSTABLE CONNECTING ARM

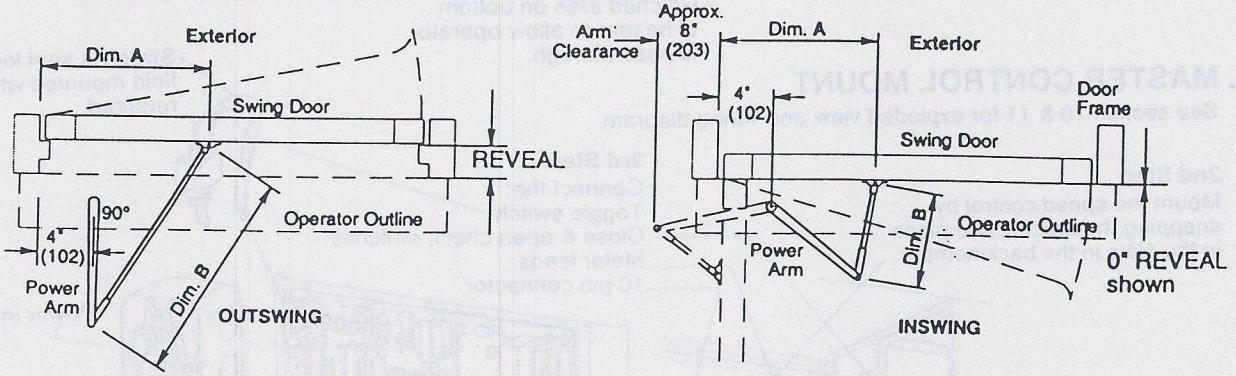
NOTE: For inswing doors without arm clearance, see section 9 for parallel arm installation.

1st Step

Locate and mount the foot (dim A) as per the arm chart below.



STANDARD ARM CONNECTIONS



ARM LENGTH CHART

REVEAL	BUTT HINGE OR OFFSET PIVOT				CENTER PIVOT 2 3/4" •			
	INSWING		OUTSWING		INSWING		OUTSWING	
	A	B	A	B	A	B	A	B
0	13"(303)	10"(254)	16"(406)	17 1/8"(435)	17"(432)	9"(229)	16"(406)	16 1/2"(419)
1/2"(13)	13"(303)	10"(254)	16"(406)	17 1/2"(445)	17"(432)	9"(229)	16"(406)	16 7/8"(429)
1"(25)	13"(303)	10"(254)	16"(406)	17 3/4"(451)	17 1/2"(445)	9 1/2"(241)	16"(406)	17"(438)
1 1/2"(38)	14"(356)	10"(254)	16"(406)	18 1/4"(464)	17 1/2"(445)	9 1/2"(241)	16"(406)	17 3/4"(451)
2"(51)	14"(356)	10 1/2"(268)	16"(406)	18 1/4"(464)	18"(457)	10"(254)	17"(432)	18 3/4"(476)
2 1/2"(64)	14"(356)	11 1/2"(292)	16 1/2"(419)	19 1/4"(489)	19"(483)	10 1/2"(268)	17"(432)	19"(483)
3"(76)	15"(381)	12 1/2"(317)	16 1/2"(419)	19 3/4"(489)	19"(483)	10 1/2"(268)	18"(457)	20"(508)
3 1/2"(89)	16"(406)	11"(379)	16 1/2"(419)	20 1/8"(511)	19"(483)	10 1/2"(268)	18"(457)	20 1/2"(521)
4"(102)	17"(432)	12"(305)	17"(432)	20 3/4"(527)	25"(635)	17"(432)	19"(483)	21 1/2"(546)

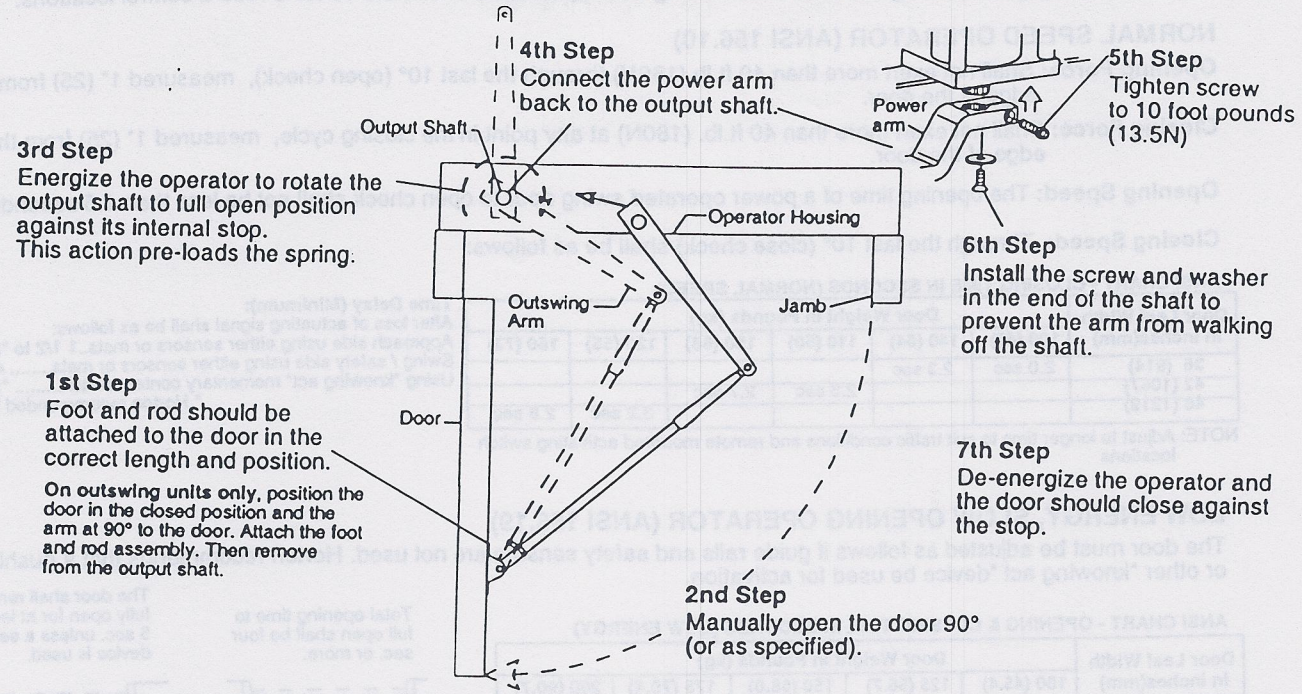
NOTE: If reveal is greater than 4" consult factory.

•Add 1" to dim. A for 3 3/4" center pivot

8. SETTING THE OPEN STOP and LOADING OPERATOR SPRING

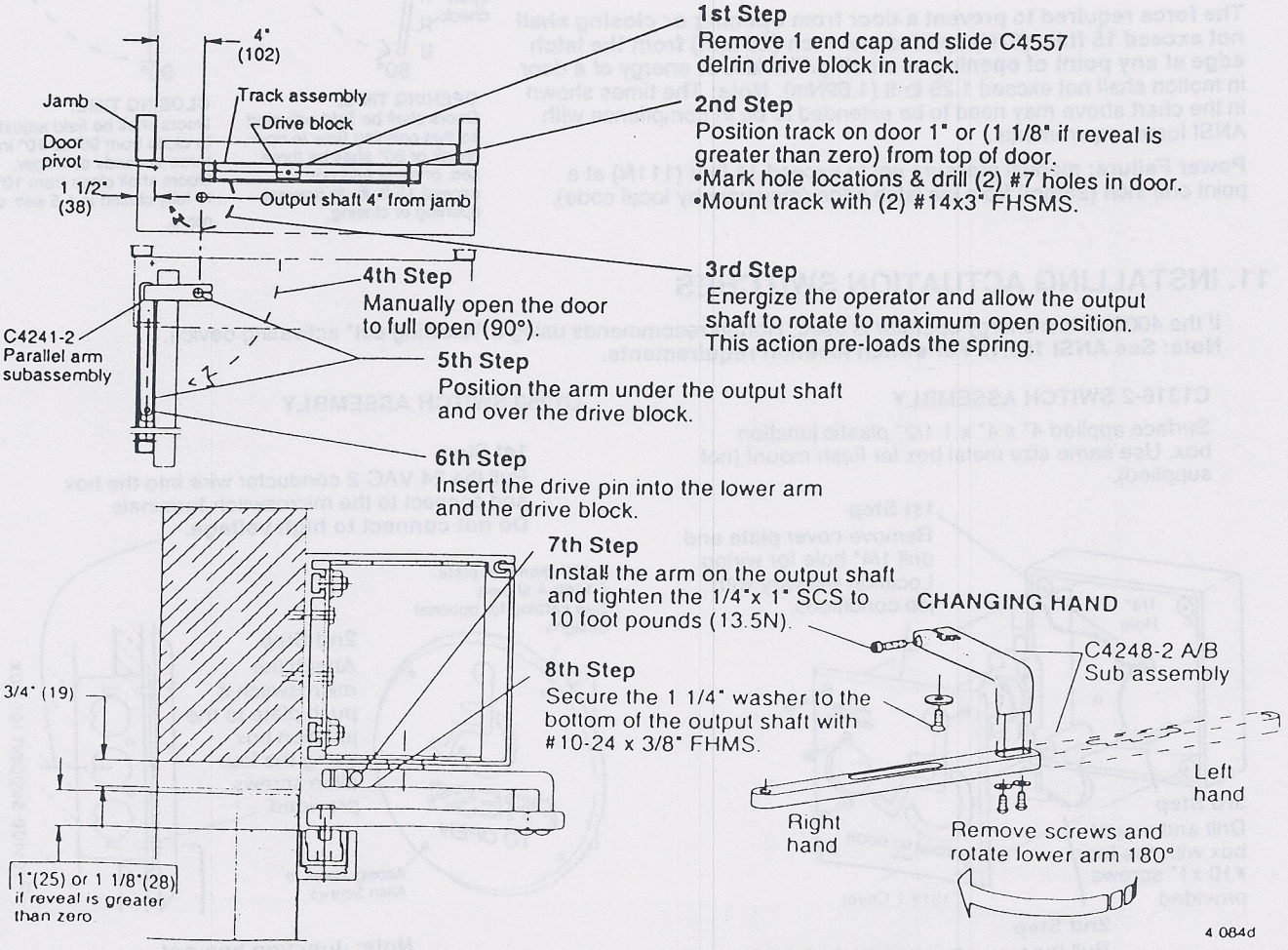
CAUTION: When installing the power arm or when servicing any swing door operator, be sure to keep your face, hands and arms clear of the power arm's swing path. **SERIOUS INJURY** could result should the operator be accidentally activated to an open position or should the operator return to a relaxed position.

The power arm must be located correctly on the output shaft so that when the operator is fully open the door will be positioned at 90° from its frame. To set the open stop and load the spring follow the instructions below.



9. INSTALLING PARALLEL ARM & TRACK

For application on butt hung, offset or center pivot inswing doors with or without breakout capability.



10. OPERATOR ADJUSTMENTS FOR CODE COMPLIANCE

The following information is provided as a recommendation for safe operating speed adjustments and should be adhered to when installing or servicing the series 4000 swing door operator. See section 10 for C4160-2 control locations.

NORMAL SPEED OPERATOR (ANSI 156.10)

Opening Force: Shall not exert more than 40 ft.lb (180N) through the last 10° (open check), measured 1" (25) from the lock edge of the door.

Closing Force: Shall not exert more than 40 ft.lb. (180N) at any point in the closing cycle, measured 1" (25) from the lock edge of the door.

Opening Speed: The opening time of a power operated swing door to open check shall not be less than 1.5 seconds.

Closing Speed: Through the last 10° (close check) shall be as follows:

ANSI CHART - CLOSING TIME IN SECONDS (NORMAL SPEED)

Door Leaf Width In Inches(mm)	Door Weight In Pounds (kg)					
	100 (45)	140 (64)	110 (50)	150 (68)	120 (55)	160 (73)
36 (914)	2.0 sec	2.3 sec				
42 (1067)			2.3 sec	2.7 sec		
48 (1219)					3.2 sec	2.8 sec

NOTE: Adjust to longer time to suit traffic conditions and remote mounted activating switch locations

Time Delay (Minimum):
After loss of actuating signal shall be as follows:
Approach side using either sensors or mats..1 1/2 to *2 Sec.
Swing / safety side using either sensors or mats..... 4 Sec.
Using "knowing act" momentary contact switch..... *5 Sec.
* Horton recommended time.

LOW ENERGY, SLOW OPENING OPERATOR (ANSI 156.19)

The door must be adjusted as follows if guide rails and safety sensors are not used. Horton recommends that a pushbutton or other "knowing act "device be used for activation.

ANSI CHART - OPENING & CLOSING TIME IN SECONDS (LOW ENERGY)

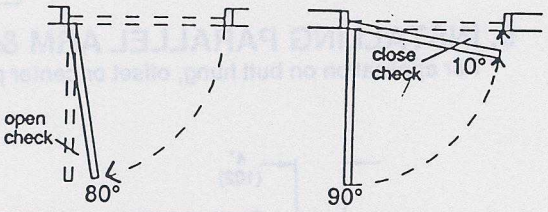
Door Leaf Width In Inches(mm)	Door Weight In Pounds (kg)				
	100 (45.4)	125 (56.7)	150 (68.0)	175 (79.4)	200 (90.7)
30 (762)	3.0 sec	3.0 sec	3.0 sec	3.0 sec	3.5 sec
36 (914)	3.0	3.5	3.5	4.0	4.0
42 (1067)	3.5	4.0	4.0	4.5	4.5
48 (1219)	4.0	4.5	4.5	5.0	5.5

The force required to prevent a door from opening or closing shall not exceed 15 ft.lb (67N) applied one inch (25 mm) from the latch edge at any point of opening or closing. The kinetic energy of a door in motion shall not exceed 1.25 lb-ft (1.69Nm). **Note:** The times shown in the chart above may need to be extended to be in compliance with ANSI force requirements.

Power Failure: manual pressure not to exceed 15 lb ft (111N) at a point one inch (25mm) from the latch edge (may vary by local code).

Total opening time to full open shall be four sec. or more.

The door shall remain fully open for at least 5 sec. unless a sensing device is used.



OPENING TIME:
Doors shall be field adjusted so that opening time to open check or 80° shall be three sec. or more and not exceed 15 ft. lb. to prevent opening or closing.

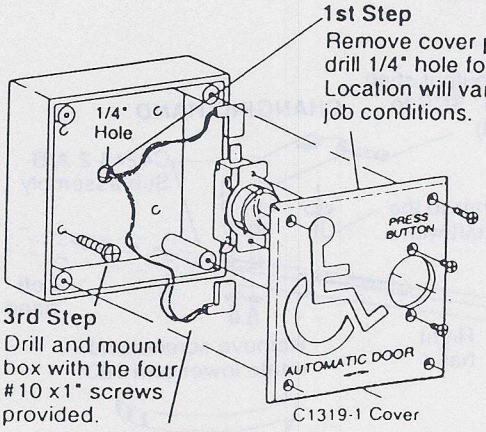
CLOSING TIME:
Doors shall be field adjusted to close from 90° to 10° in three seconds or longer. Doors shall close from 10° to fully closed in 1.5 sec. or more.

11. INSTALLING ACTUATION SWITCHES

If the 4000LE low energy operator is used, Horton recommends using a "knowing act" activating device.
Note: See ANSI 156.19 For switch location requirements.

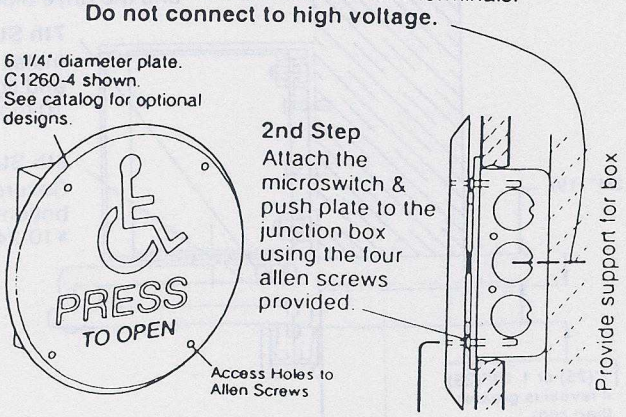
C1316-2 SWITCH ASSEMBLY

Surface applied 4" x 4" x 1 1/2" plastic junction box. Use same size metal box for flush mount (not supplied).



C1260 SWITCH ASSEMBLY

1st Step
Pull the 24 VAC 2 conductor wire into the box and connect to the microswitch terminals.
Do not connect to high voltage.



Note: Junction box not included in assembly.

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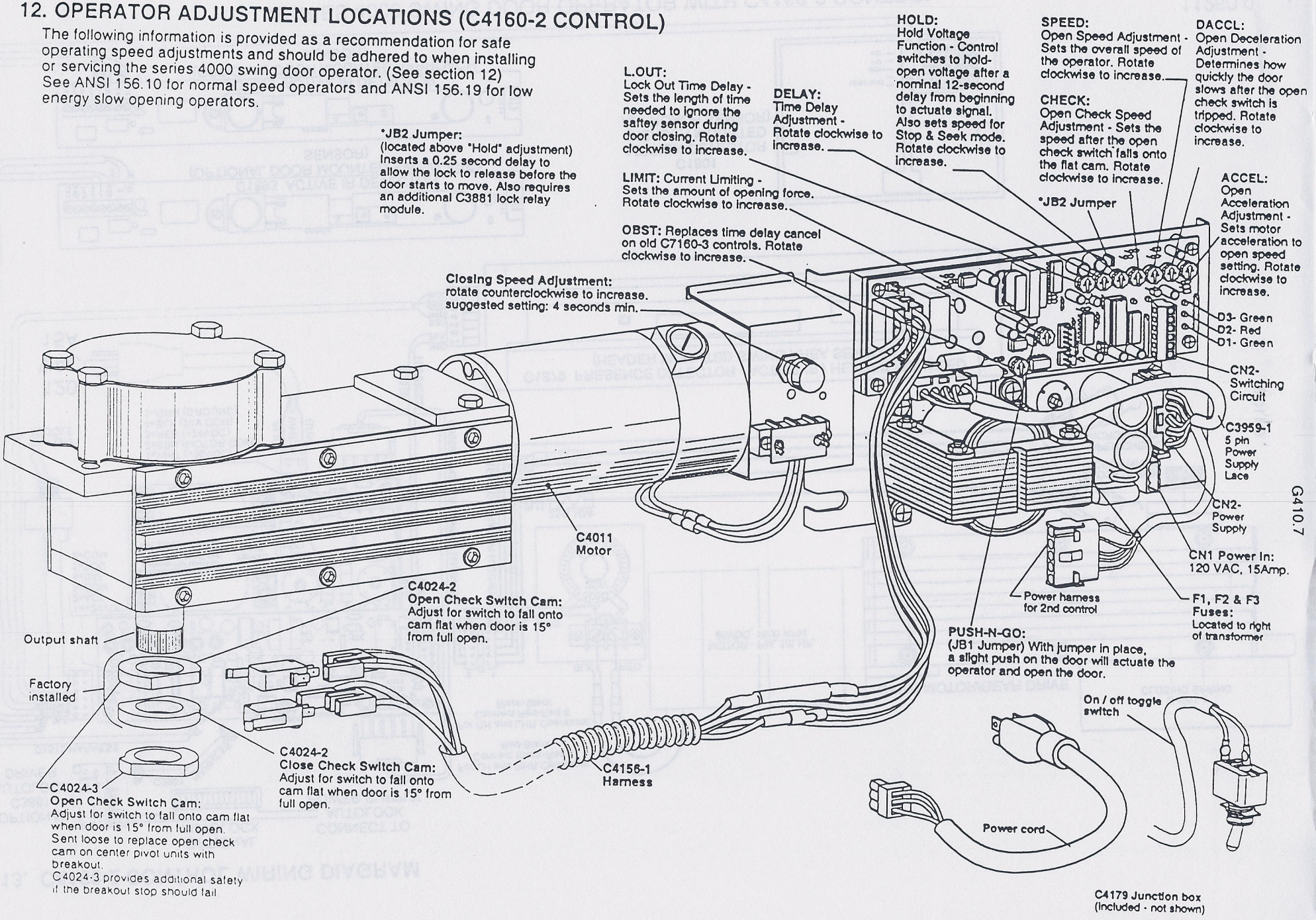
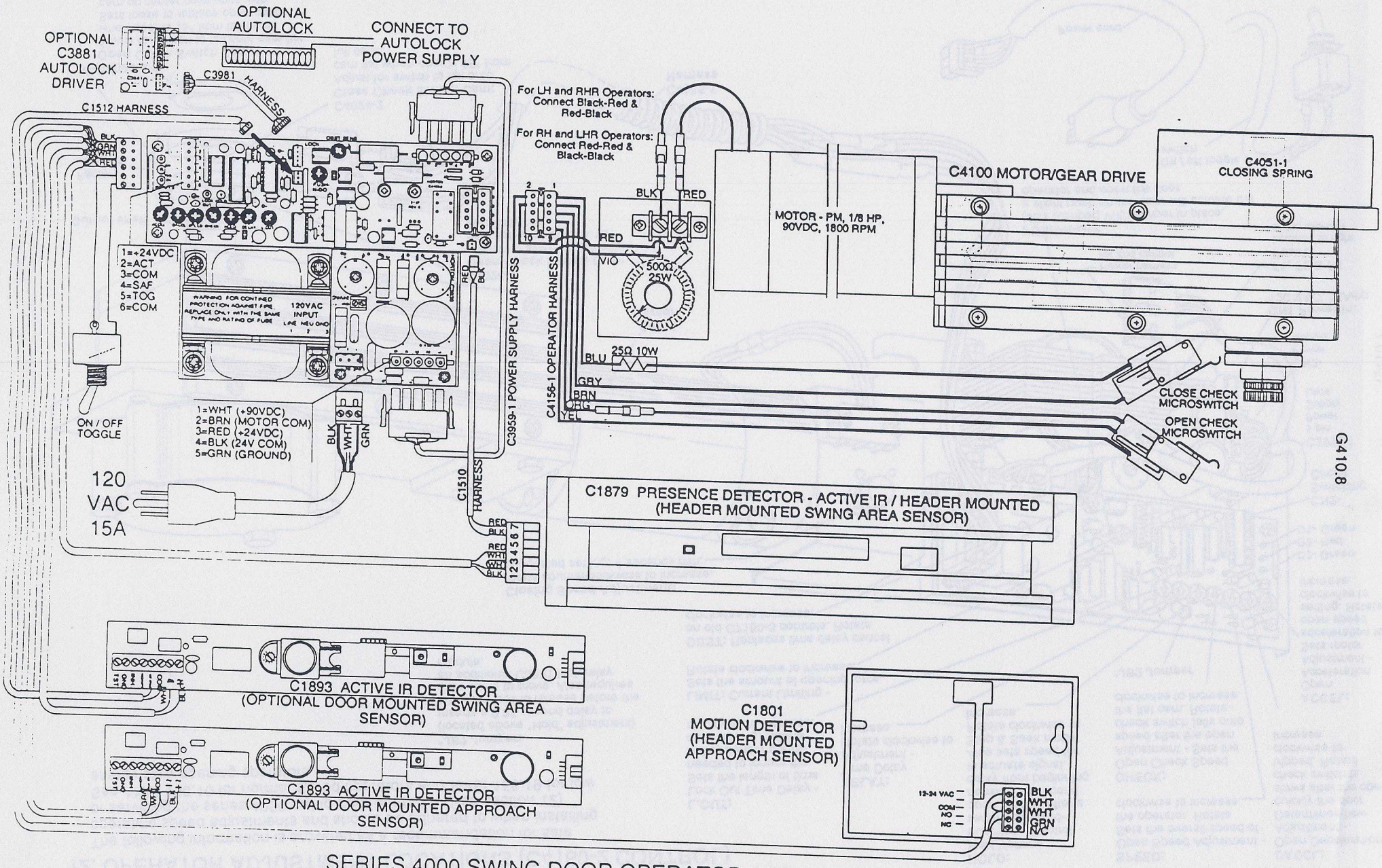
12. OPERATOR ADJUSTMENT LOCATIONS (C4160-2 CONTROL)

The following information is provided as a recommendation for safe operating speed adjustments and should be adhered to when installing or servicing the series 4000 swing door operator. (See section 12) See ANSI 156.10 for normal speed operators and ANSI 156.19 for low energy slow opening operators.



13. C4160-2 CONTROL WIRING DIAGRAM



SERIES 4000 SWING DOOR OPERATOR WITH C4160-2 CONTROL

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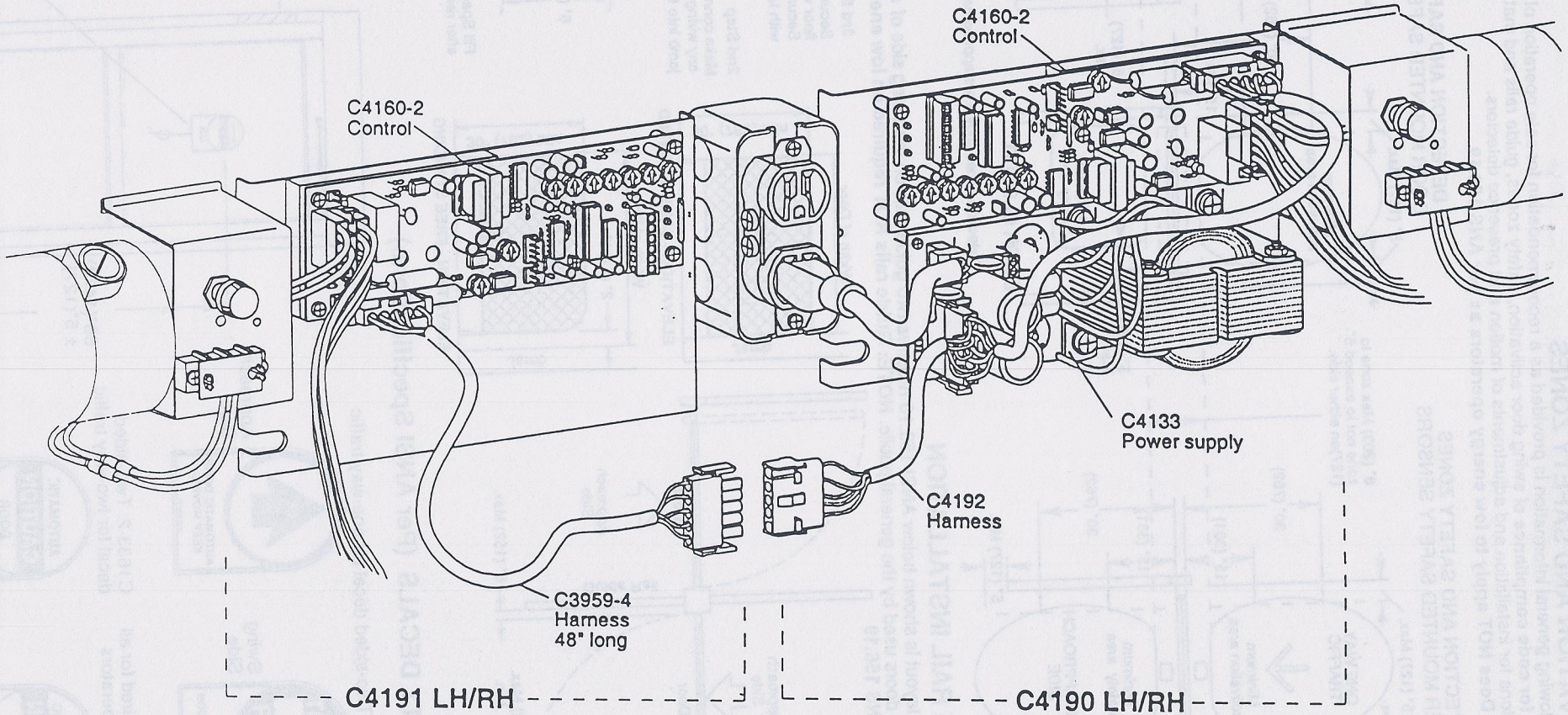
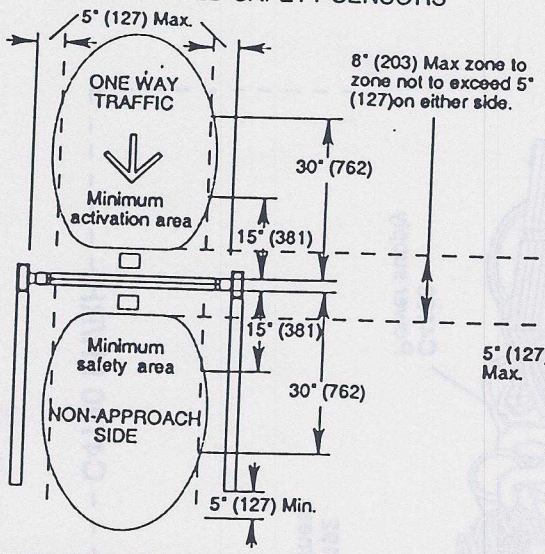
14. DUAL CONTROLS WITH ONE POWER SUPPLY



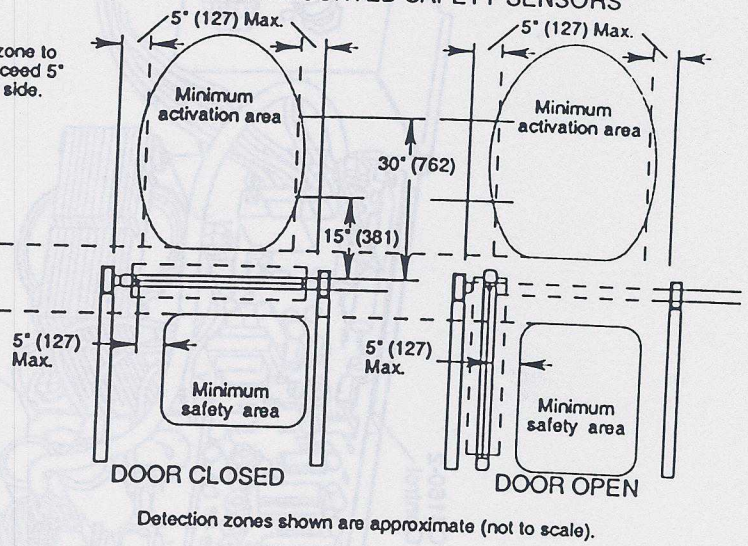
15. ACTIVATION AND SAFETY ZONES

The following general information is provided as a recommendation for safe operation of normal speed operator (see ANSI 156.10 for code compliance of swing door activation, safety zones, guide rails and mat layouts. See manufacturers instructions for installation and adjustments of motion and presence detectors.
NOTE: Does NOT apply to low energy operators as per ANS 156.19.

DETECTION AND SAFETY ZONES
HEADER MOUNTED SAFETY SENSORS



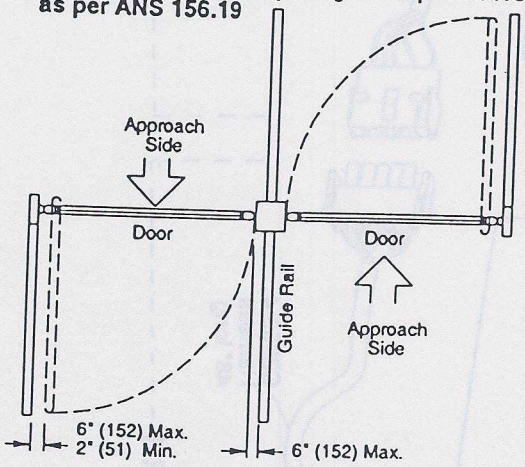
DETECTION AND SAFETY ZONES
DOOR MOUNTED SAFETY SENSORS

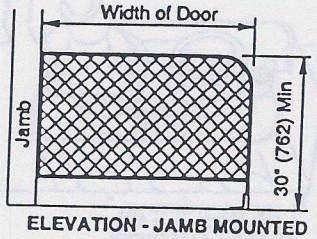


Detection zones shown are approximate (not to scale).

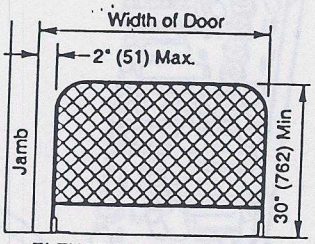
16. GUIDE RAIL INSTALLATION

A typical layout is shown below ANSI 156.10 requires two guide rails on the swing side of *normal speed* power operated doors used by the general public. **NOTE: Guide rails NOT required on low energy,slow speed operators as per ANS 156.19**





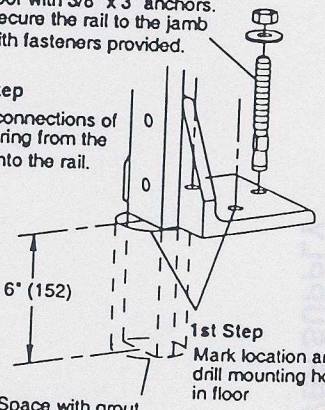
ELEVATION - JAMB MOUNTED



ELEVATION - FREE STANDING

3rd Step
Secure the rail to the floor with 3/8" x 3" anchors. Secure the rail to the jamb with fasteners provided.

2nd Step
Make connections of any wiring from the jamb into the rail.



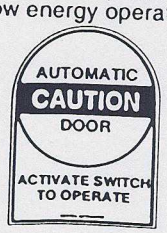
17. SAFETY DECALS (Per ANSI Specifications)

C1631-3: Two-sided decal for one-way traffic

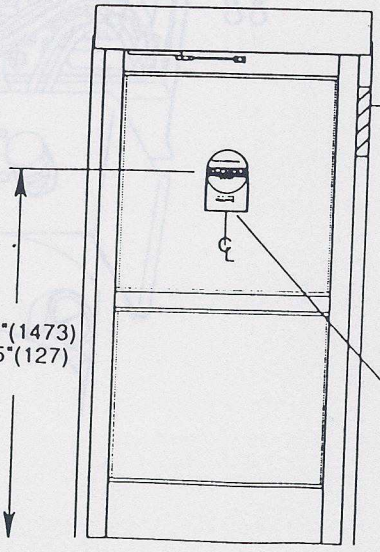
Swing Side

Approach Side

C7280: Required for all low energy operators



C1633-2: Two-sided decal for two-way traffic



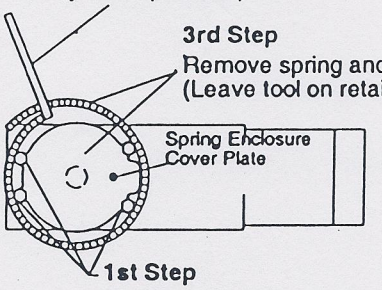
C1690
Daily safety check decal should be placed on the door jamb in full view (use C1690R for low energy operators).

Decals should be a min. of 6"(152) diameter and be visible from both sides of the door.

18. CHANGING OPERATOR SPRING AND HAND

2nd Step
Set the Horton spring removal tool or Rigid #2-24" strap wrench against the spring force. Hold the spring retainer in the correct position and remove the last 2 bolts. Allow the retainer to fully relax (1/2 turn).

3rd Step
Remove spring and retainer. (Leave tool on retainer)

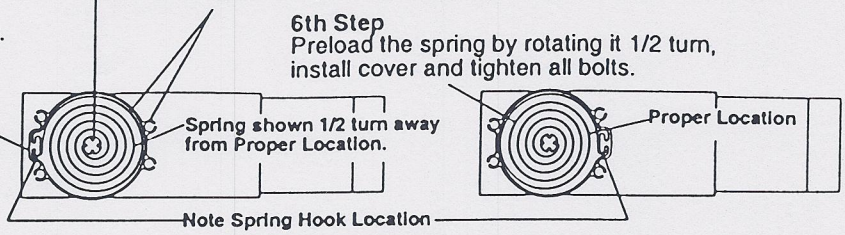


1st Step
Clamp operator in a vise and remove two HHMB and loosen the third.

4th Step
Rotate the spring arbor (output shaft) as far as it will go in the opposite direction (240°), use power arm for leverage if necessary.

5th Step
Turn spring retainer and spring over and place on the notched arbor approximately 1/2 turn away from proper location (proper location is where the bolt pattern matches).

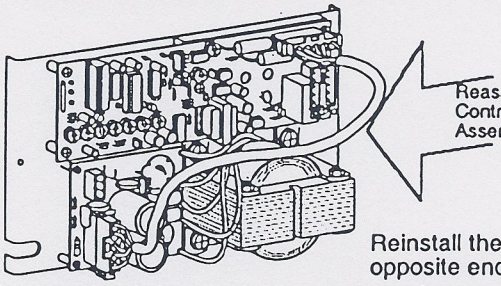
6th Step
Preload the spring by rotating it 1/2 turn, install cover and tighten all bolts.



7th Step
Wire motor correctly for new hand.(See section 6)
Reinstall operator and adjust cams as necessary.

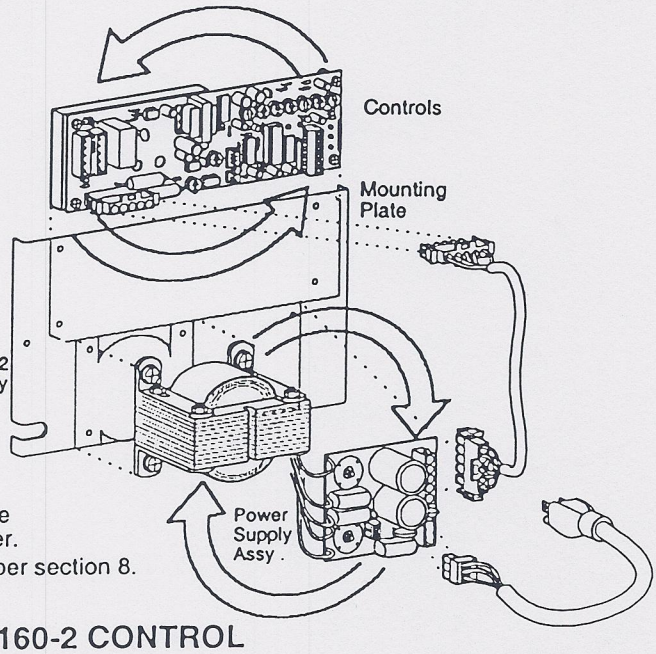
To change hand remove operator and mounts. Reverse mounts on the operator (turn brackets upside down and attach to the other side of the operator).
Remove the C4160-2 controls and reposition components as shown.

1. REMOVING C4160-2 CONTROLS ASSEMBLY:
A. Disconnect all plugs from controls assembly and remove from chassis.
B. Remove controls from mounting plate, rotate 180° and reinstall. Do Likewise with power supply assembly



Reinstall the control on the opposite end of the header.

After operator is installed adjust cams and reset open stop as per section 8.



19. TROUBLE SHOOTING GUIDE FOR THE C4160-2 CONTROL

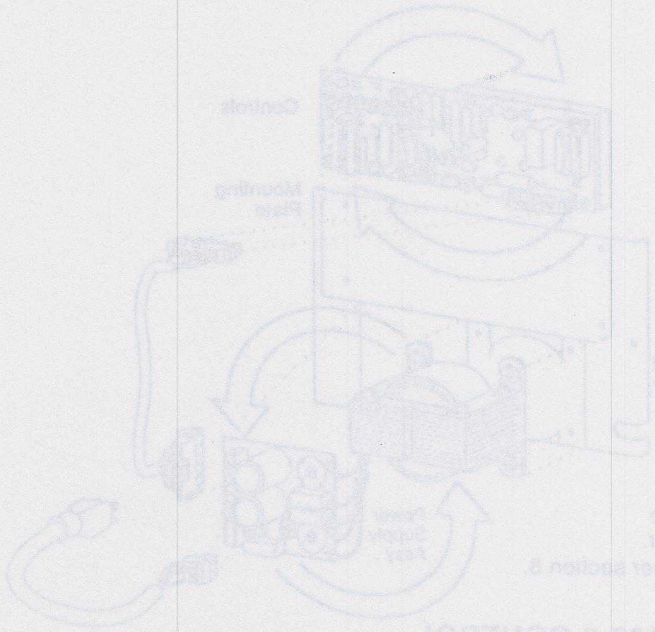
Electrical Check all plug connections and micro switches then the following items should be checked in the following order.
1. Is high voltage present. Check the power supply at CN1 input for 120VAC.
2. With high voltage present, move to the 5 pin power supply lace and check for voltages between 1 & 2, +90VDC, probe through back of plug with VOM leads and then between 3 & 4, +24VDC. Move the meter leads to the 5 pin plug at the control and confirm voltages again.

No Voltage Present, No operation:
No Voltage at CN2 pins 1 & 2, check fuse at the F2 location on the power supply.
A. Disconnect 120VAC plug, disconnect 5 pin power supply plug, and disconnect motor leads. Replace fuse.
B. Check motor for frame short or shorted motor. Checks good move on to step C.
C. Reestablish 120VAC and confirm fuse status. Reestablish 5 pin plug and confirm fuse status, if blown chances are we have a bad control. If the fuse is still good, reestablish motor connection and test operation.

No Voltage at 3 &4, check fuses at the F1 and F3 location, located on the power supply.
A. Disconnect 120VAC plug, disconnect 5 pin power supply plug, disconnect 2 pin motor plug and remove 6 pin input plug at CN2. Replace fuse.
B. Check low voltage activation circuit for possible shorts in the 24VDC wiring, possible chaffing at frame to door cords or frame to header connections.
C. Reestablish 120VAC and confirm fuse status. Reestablish 5 pin plug and confirm fuse status, if blown chances are we have a bad control. If the fuse is still good, reestablish CN2 input connection and 2 pin motor plug, test operation

Voltage Present, No Operation:
Confirmation of switch circuits at CN2 can be made by watching led inputs.
A. First confirm D3 circuit is closed, green D3 light should be on. No light, check toggle circuit. A quick check of the circuit wiring can be made by jumping pins 5 & 6 of CN2.
B. Confirm that the red D2 Safety Circuit light is off.
C. Activate door with the external activate circuit, this will confirm the switching circuit. No light at D1 would indicate a malfunction in the circuit or wiring and could be confirmed by jumping pins 2 & 3 at CN2.
D. Last but not least, confirm that the Open Speed pot is turned up enough to drive the door open.

Voltage Present, High Speed, No Speed Control:
Usually indicates a blown or shorted Mosfet transistor, at this point the control must be replaced.



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