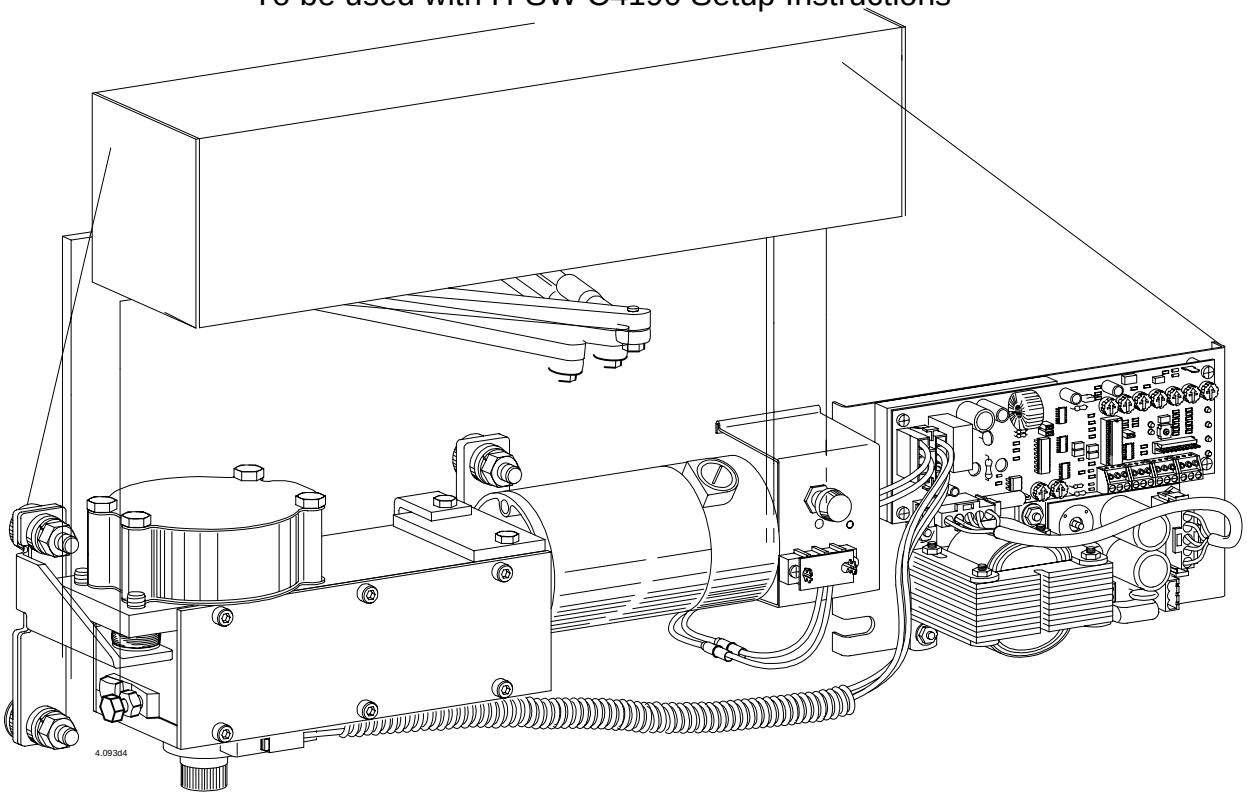
Series 4100

Surface Applied Swing Door Operator with C4190 Control

INSTALLATION INSTRUCTIONS

To be used with H-SW C4190 Setup Instructions



Horton AUTOMATICS

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.

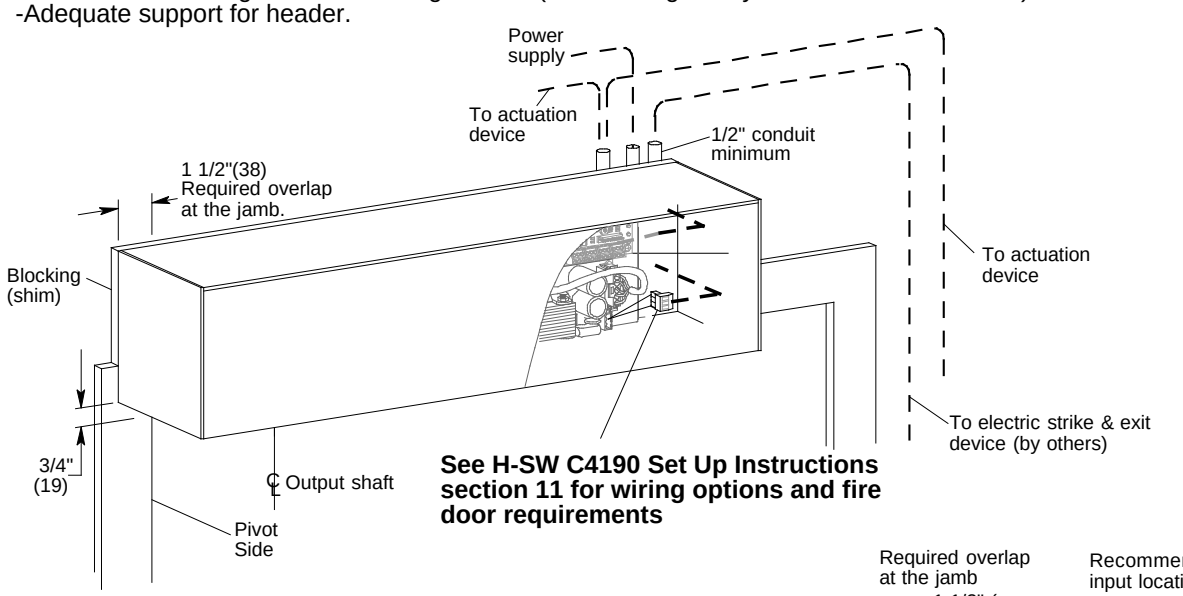
INFORMATION TO BE PROVIDED BY THE DISTRIBUTOR TO THE OWNER

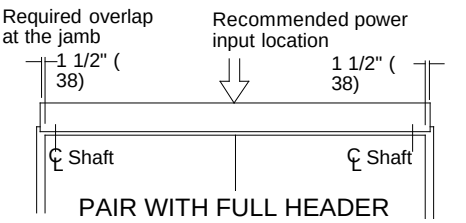
-After installation instruct the owner on the safe operation of the door.
-Present the Owner's Manual M310 and explain how to perform the Daily Safety Check.
-Location of power on / off switch.
-Necessary warnings not covered in these general instructions.
-Date equipment shipped from Horton Automatics.
-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.

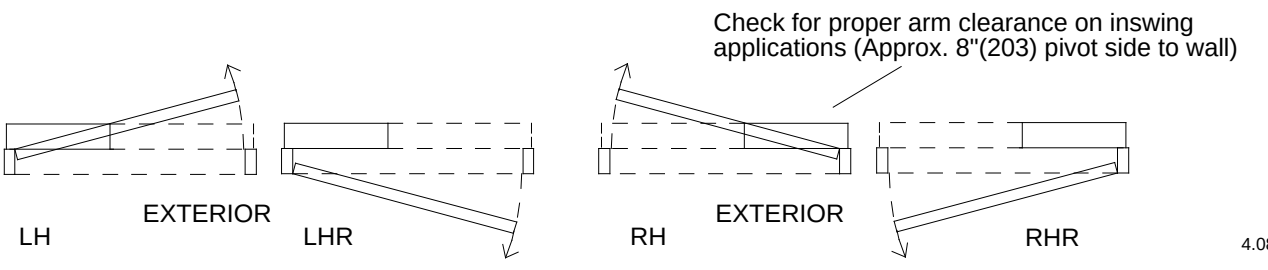




NOTE:
-If this is a 4100 LE see ANSI 156.19 for guide lines on handicap operation and switching.
-Refer to section 19 for required decals.

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)

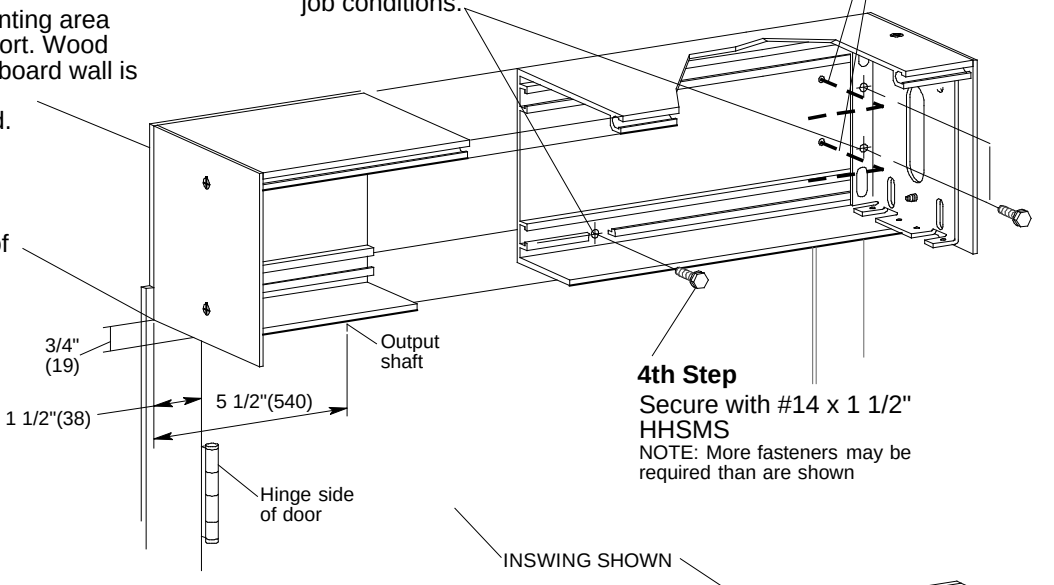
1st Step
Check the mounting area for proper support. Wood blocking in wallboard wall is recommended. Shim if required.

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.

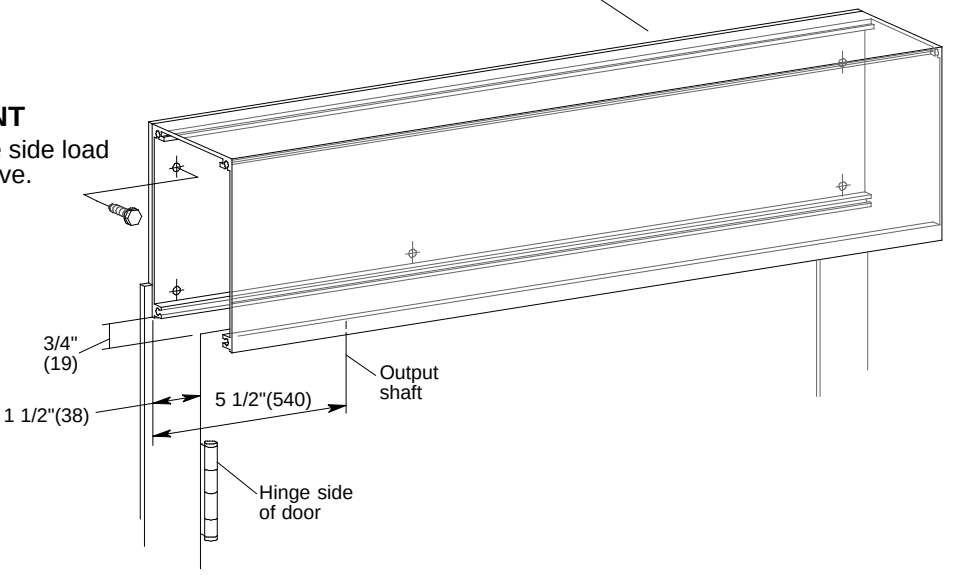
4th Step
Secure with #14 x 1 1/2" HHSMS
NOTE: More fasteners may be required than are shown

5th Step
Pull power and actuation wires into header.

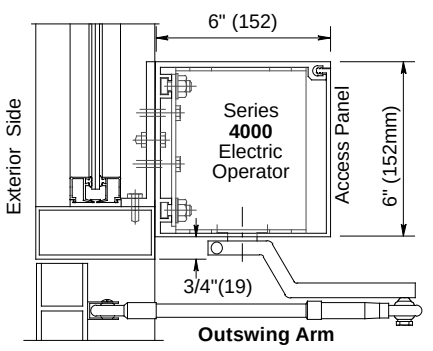


BOTTOM LOAD MOUNT

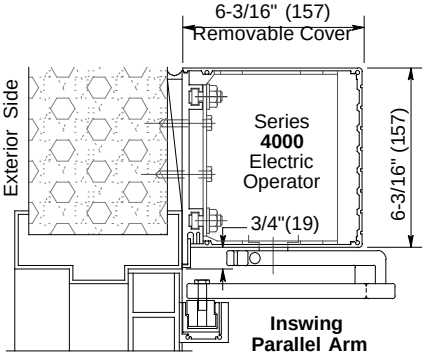
Installation is similar to the side load instructions described above.



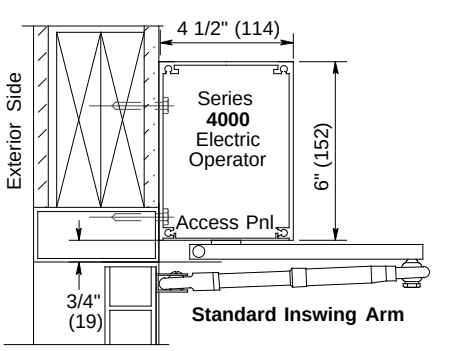
ADDITIONAL MOUNTING CONDITIONS



Series 4100 Side Load



Series 4100 Full Access

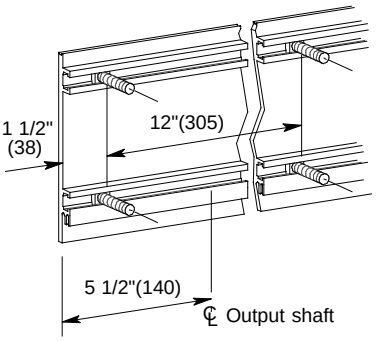


Series 4100 Bottom Load

5. OPERATOR INSTALLATION

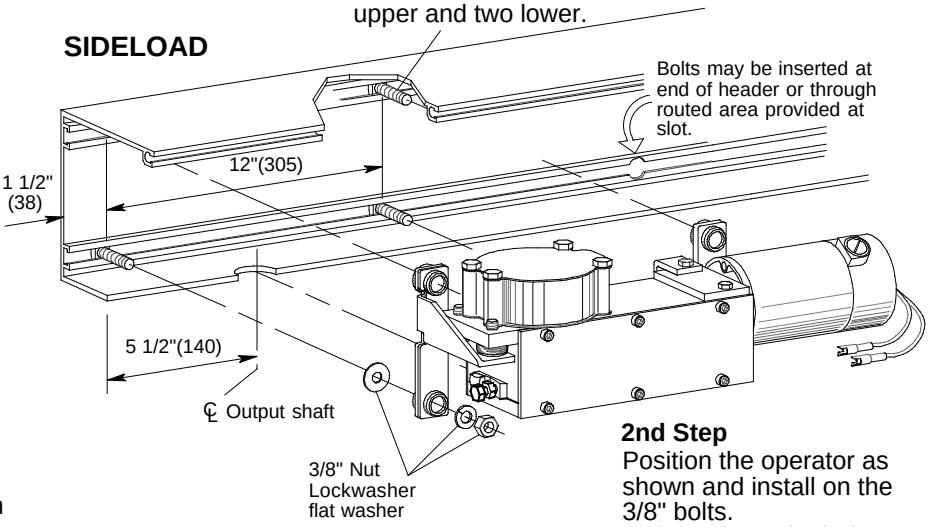
1st Step
Insert the square head bolts in the channel slots - two upper and two lower.

FULL ACCESS



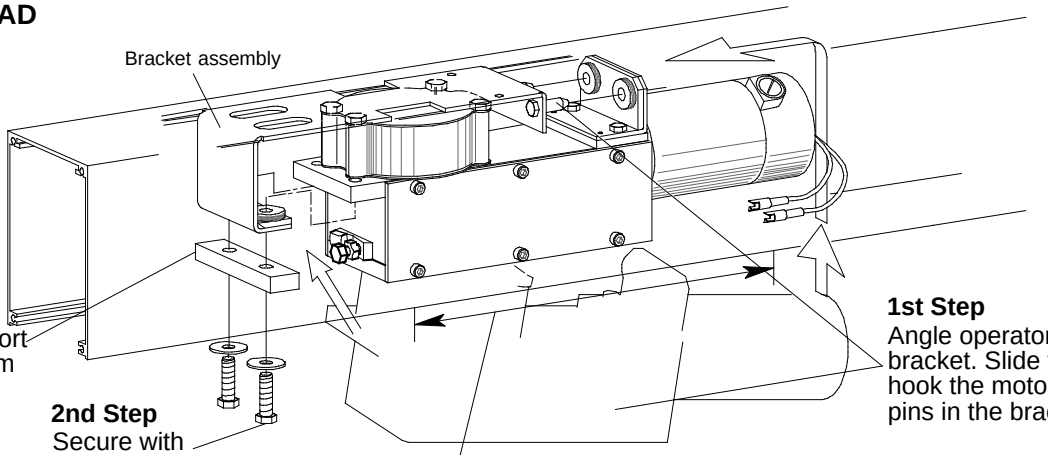
Full access operator installation same as sideload

SIDELOAD

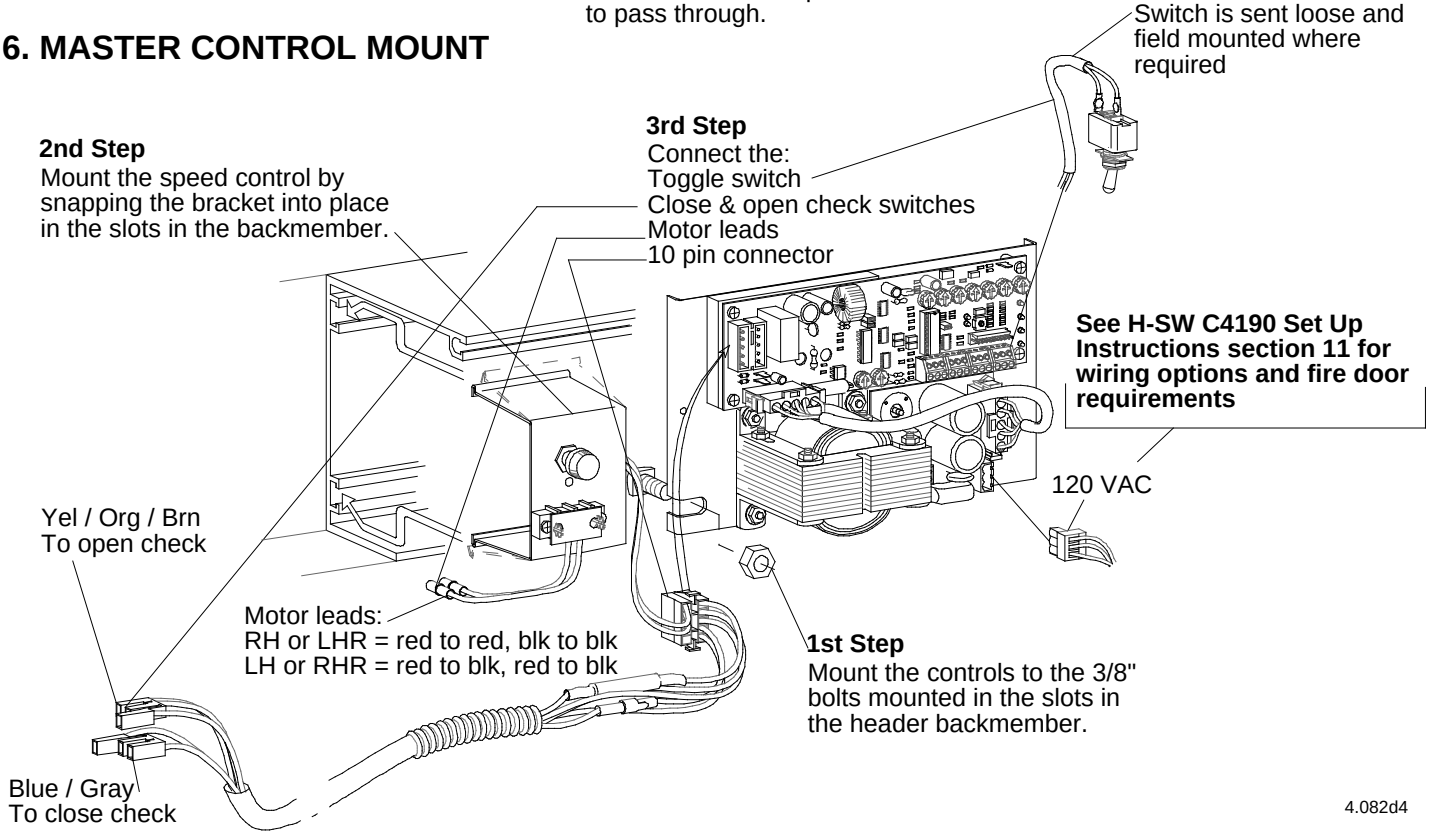


2nd Step
Position the operator as shown and install on the 3/8" bolts.
Tighten down the bolts.

BOTTOM LOAD



6. MASTER CONTROL MOUNT

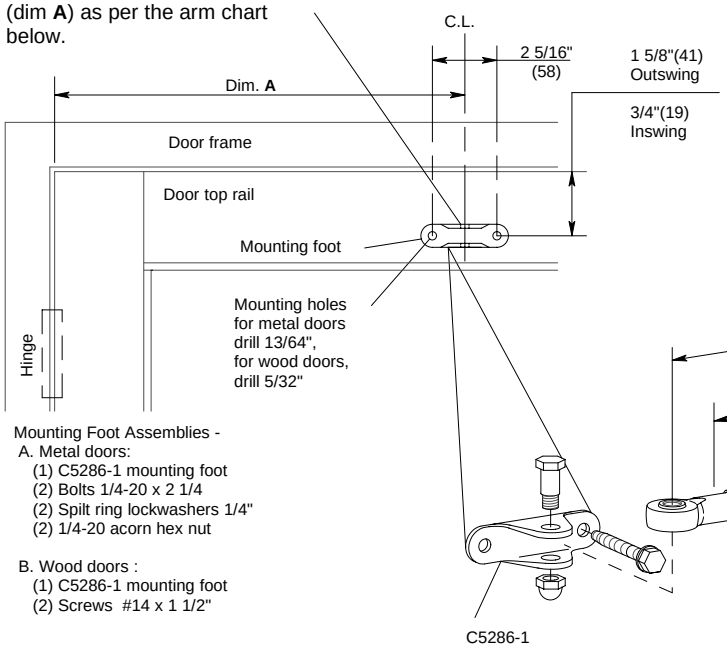


7. INSTALLING ADJUSTABLE CONNECTING ARM

NOTE: For inswing doors without arm clearance, see section 7 for parallel arm installation.

1st Step

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

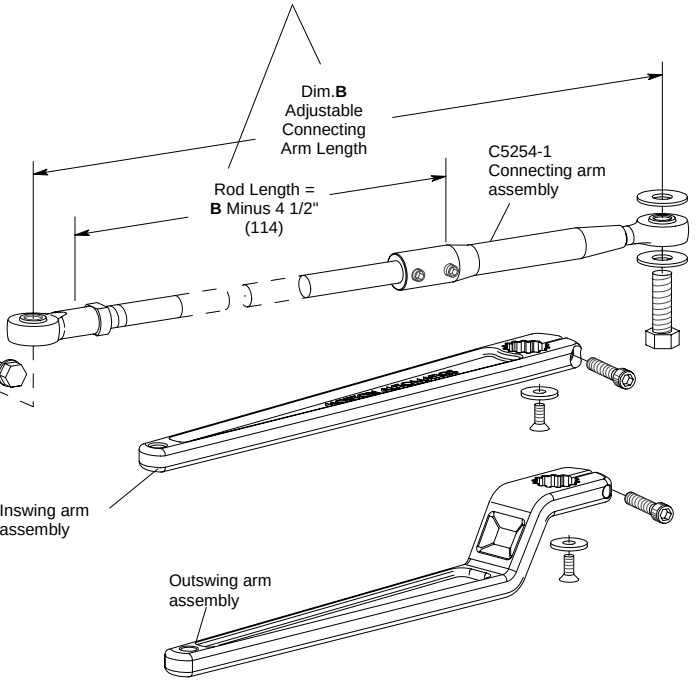


Mounting Foot Assemblies -
A. Metal doors:
(1) C5286-1 mounting foot
(2) Bolts 1/4-20 x 2 1/4
(2) Spilt ring lockwashers 1/4"
(2) 1/4-20 acorn hex nut

B. Wood doors :
(1) C5286-1 mounting foot
(2) Screws #14 x 1 1/2"

2nd Step

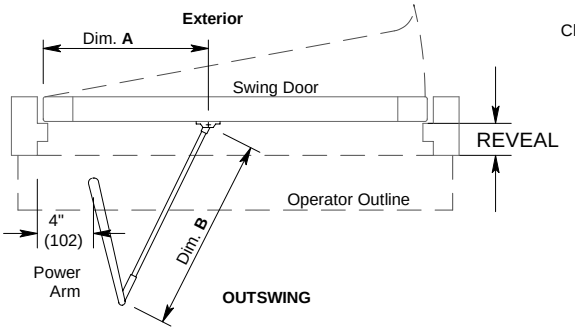
Determine the proper length of the adjustable rod (dim **B**) and cut as required.

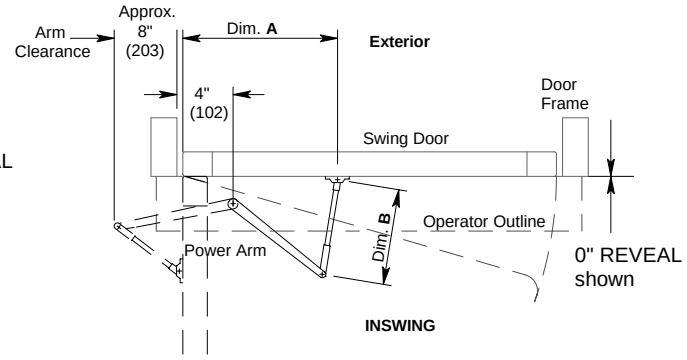


3rd Step

Assemble the connecting arm and attach it to the mounting foot.

STANDARD ARM CONNECTIONS





ARM LENGTH CHART

	BUTT HUNG OR OFFSET PIVOT				*CENTER PIVOT 2 3/4"			
	INSWING		OUTSWING		INSWING		OUTSWING	
REVEAL	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"(25.4)	13" (303)	10 " (254)	16" (406)	17 3/4"(451)	17 1/2" (445)	9 1/2" (241)	16" (406)	17" (432)
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"(63)	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"(502)	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.*

* For 3 3/4" center pivot add 1" to dim. A

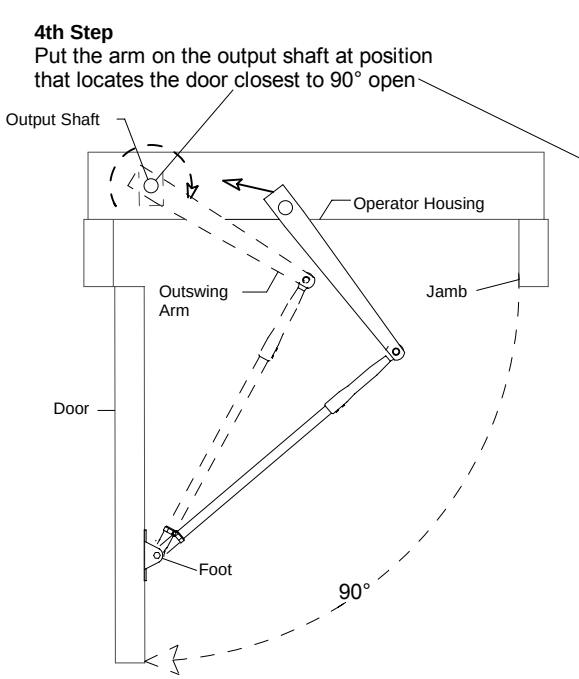
8. SETTING THE OPEN STOP and LOADING OPERATOR SPRING

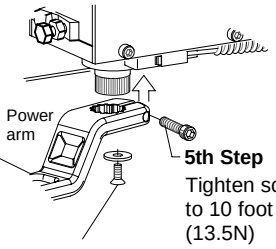
CAUTION: When installing the power arm or when servicing any swing door operator, be sure to keep your face, hands and arms clear of the power arm's swing path**. SERIOUS INJURY** could result should the operator be accidentally activated to an open position or should the operator return to a relaxed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

1st Step
Foot and rod should be attached to the door in the correct length and position.

2nd Step
Manually open the door 90° (or as specified).

3rd Step
Energize the operator to rotate the output shaft to full open position against its internal stop.
This action pre-loads the spring.





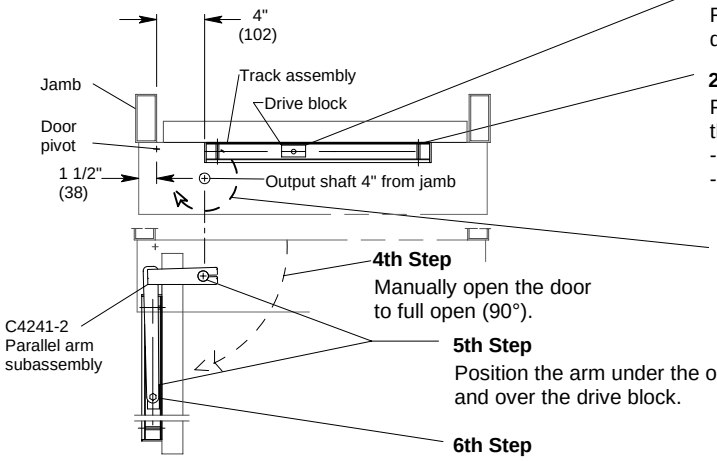
6th Step
Install the screw and washer in the end of the shaft to prevent the arm from sliding off the shaft.

7th Step
Fine tune the door position by adjusting the connecting arm length to get the door to a 90° open position

8th Step
De-energize the operator; the door should close against the stop.

9. INSTALLING PARALLEL ARM & TRACK

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



1st Step
Remove 1 end cap and slide C4557 delrin drive block in track.

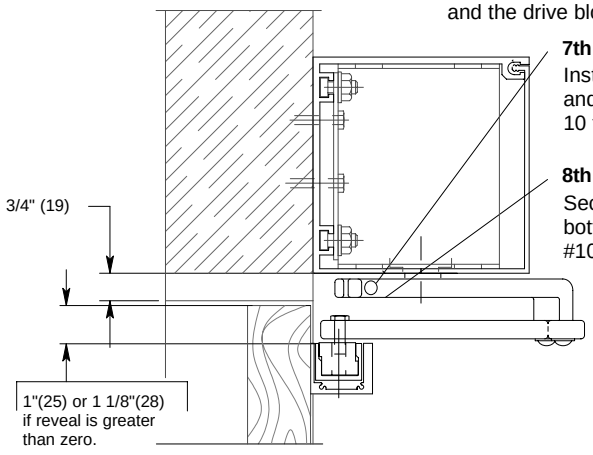
2nd Step
Position track on door 1" or (1 1/8" if reveal is greater than zero) from top of door.
-Mark hole locations & drill (2) #7 holes in door.
-Mount track with (2) #14x3" FHSMS.

3rd Step
Energize the operator and allow the output shaft to rotate to maximum open position.
This action pre-loads the spring.

4th Step
Manually open the door to full open (90°).

5th Step
Position the arm under the output shaft and over the drive block.

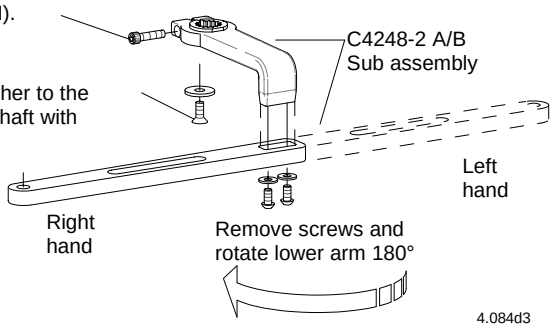
6th Step
Insert the drive pin into the lower arm and the drive block.



7th Step
Install the arm on the output shaft and tighten the 1/4"x 1" SCS to 10 foot pounds (13.5N).

8th Step
Secure the 1 1/4" washer to the bottom of the output shaft with #10-24 x 3/8" FHMS.

CHANGING HAND



4.084d3

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 inPounds (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: Adjustto longertimeto suit traffic conditions and remote mounted activating switch locations

Time Delay (Minimum):
After loss of actuatingsignal 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.

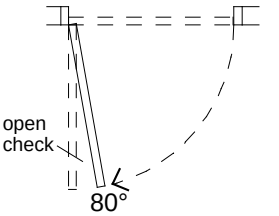
ANSI CHART - OPENING & CLOSING TIME IN SECONDS (LOW ENERGY)

Door Leaf Width in Inches(mm)	Door Weight inPounds (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.

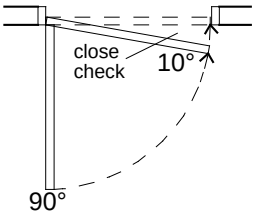
Power Failure: manual pressure not to exceed 15 lb ft (111N) at a point one inch (25mm) from the latch edge (may vary by local code).

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



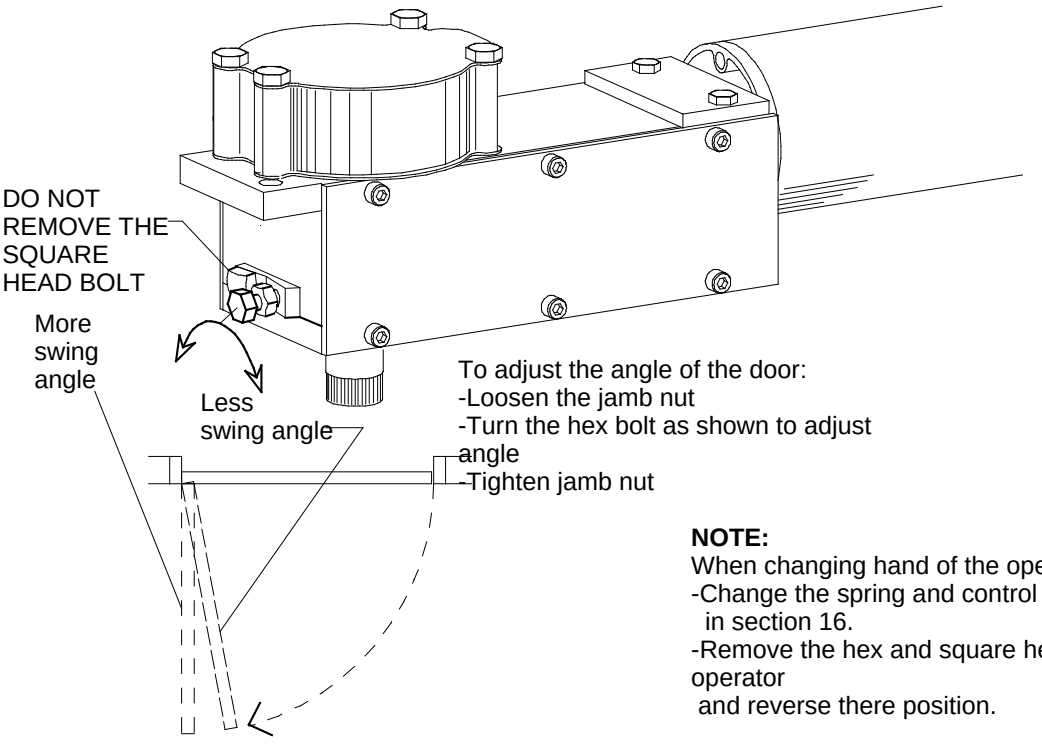
OPENING TIME:
Doorsshall be field adjusted sothat opening time to open check or 80° shall be three sec. or more andnot exceed 15 ft. lb.
to prevent opening or closing.

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



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

11. ADJUSTMENT OF OPENING ANGLE



To adjust the angle of the door:
-Loosen the jamb nut
-Turn the hex bolt as shown to adjust angle
-Tighten jamb nut

NOTE:
When changing hand of the operator -
-Change the spring and control as shown in section 16.
-Remove the hex and square head bolts from the operator
and reverse there position.

L2. 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 13)
See ANSI 156.10 for normal speed operators and ANSI 156.19 for low energy slow opening operators.

***JB1 Jumper:**
(Push - N - Go) With jumperin place, a slight pushon the door will actuate the operator and open the door.

****JB2 Jumper:**
Remove to disable touch stop

*****JB3 Jumper:**
Inserts a 0.25 second delay to allow the lockto release before the door starts to move.

L.OUT:
Lock Out Time Delay - Sets the length of time neededto ignore the safteysensor during door closing. Rotate clockwise to increase.

DELAY:
Time Delay Adjustment - Rotate clockwise to increase.

HOLD:
Hold Voltage Function - Control switches to hold-open voltage after a nominal 10-12 second delay from beginning to actuate signal. Also sets speed for Stop& Seek mode. Rotate clockwise to increase.

SPEED:
Open Speed Adjustment - Sets the open speed of the operator. Rotate clockwise to increase.

DACCL:
Open Deceleration Adjustment - Determines how quickly the door slows after the open check switch is tripped. Rotate clockwise to increase.

CHECK:
Open Check Speed Adjustment - Sets the speed after the open check switch falls onto the flat cam. Rotate clockwise to increase.

ACCEL:
Open Acceleration Adjustment - Sets motor acceleration to open speed setting. Rotate clockwise to increase.

LIMIT: Current Limiting - Sets the amountof opening force. Rotate counter-clockwise to increase.

OBST: Replacestime delay cancel on old C7160-3 controls. Rotate clockwise to increase.

*****JB3 Jumper**
Lock Enable

****JB2 Jumper**
***JB1 Jumper**

Closing Speed Adjustment:
rotate counterclockwise to increase. suggested setting: 4 seconds min.

D4- Orange
D3- Green
D2- Red
D1- Green
CN4
S 1
CN2- Switching Circuit
C3959-1 5 pin Power Supply Lace
CN2- Power Supply
CN1 Power in: 120 VAC, 15Amp.

F1, F2 & F3 Fuses: Located to right of transformer

To ground wire on incoming line

C4011 Motor

Red
Blk

For LH and RHR operators connect Black-Red & Red-Black

For RH andLHR operators connect RED-Red & Black-Black

C4024-2 Open Check Switch Cam: Adjust for switchto fall onto cam flat when door is 10 deg from full open.

Output shaft

Factory installed

C4024-2 Close Check Switch Cam: Adjust for switchto fall onto cam flat when door is 10 deg from full closed.

C4156-1 Harness

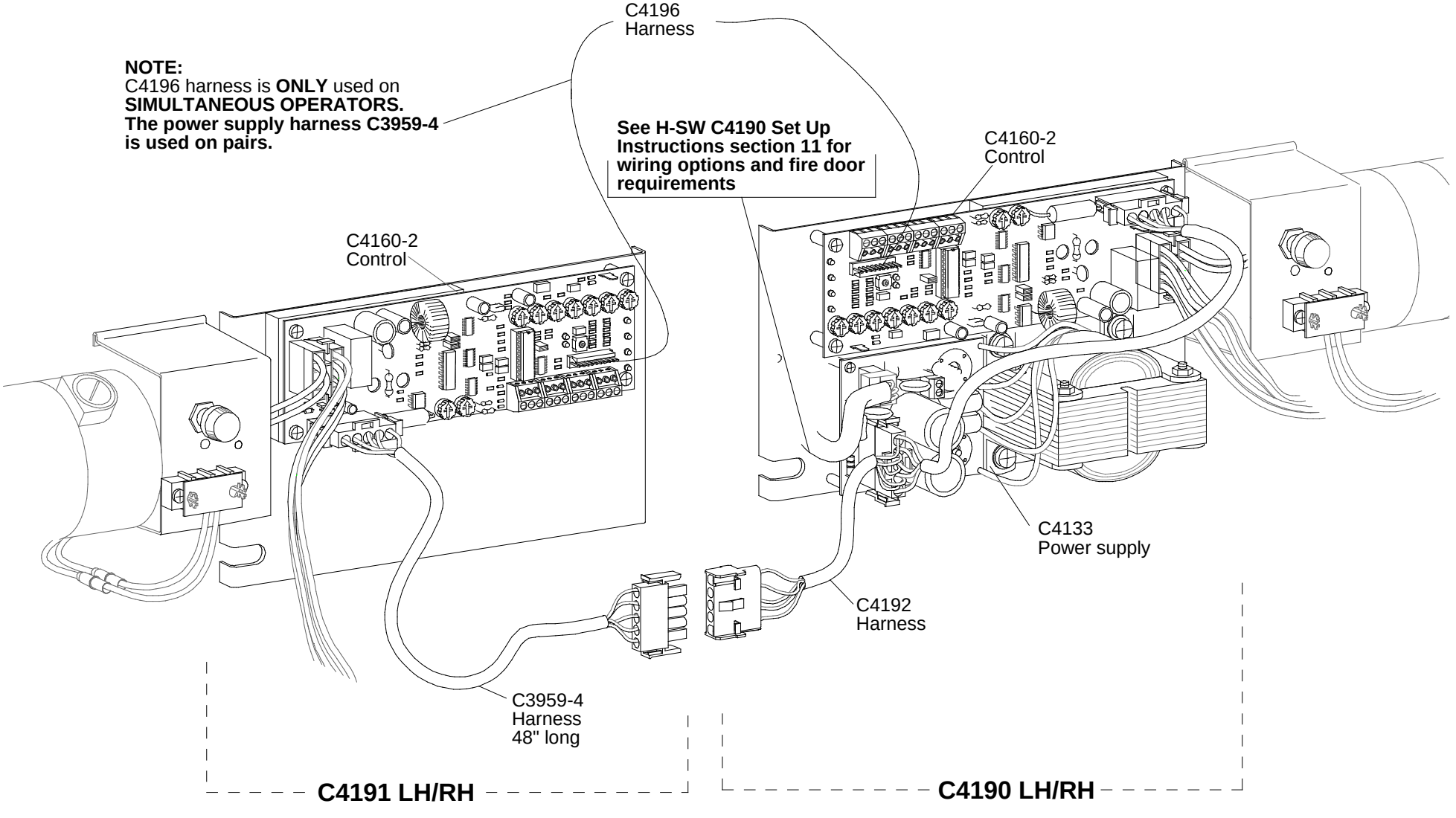
C4024-3 Open Check Switch Cam: Adjust for switchto fall onto cam flat when door is 10 deg from full open. Sent loose to replace open check cam on center pivot units with breakout.
C4024-3 provides additional safety if the breakoutstop should fail.

See H-SW C4190 Set Up Instructions section 11 for wiring options and fire door requirements

G410.7

13. DUAL CONTROLS WITH ONE POWER SUPPLY

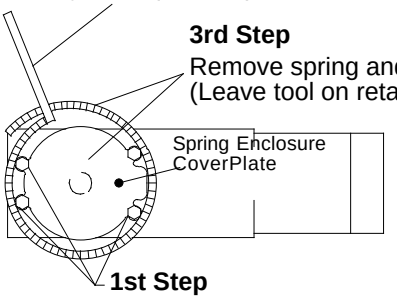
Set up the controls as outlined in previous sections and make the connections as shown on this page.



14. 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)

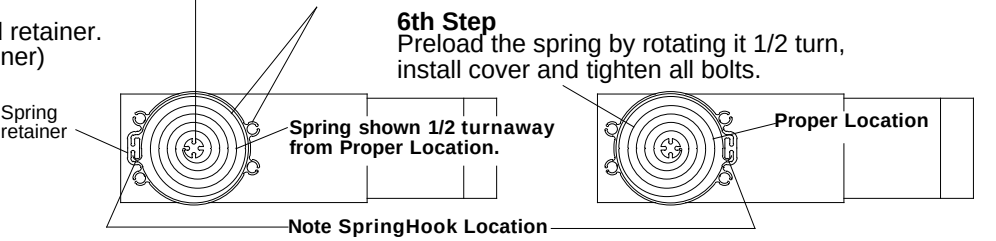


1st Step
Clamp operator in a vise and remove two HHMB and loosen the third.

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).

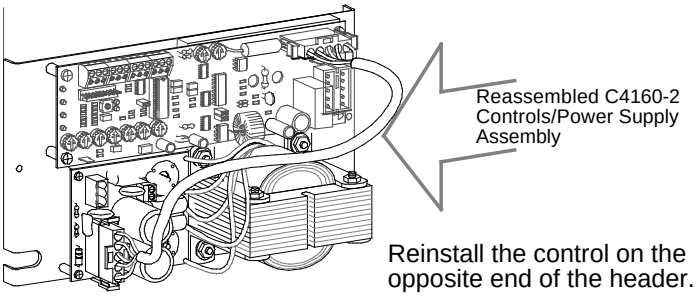
6th Step
Preload the spring by rotating it 1/2 turn, install cover and tighten all bolts.



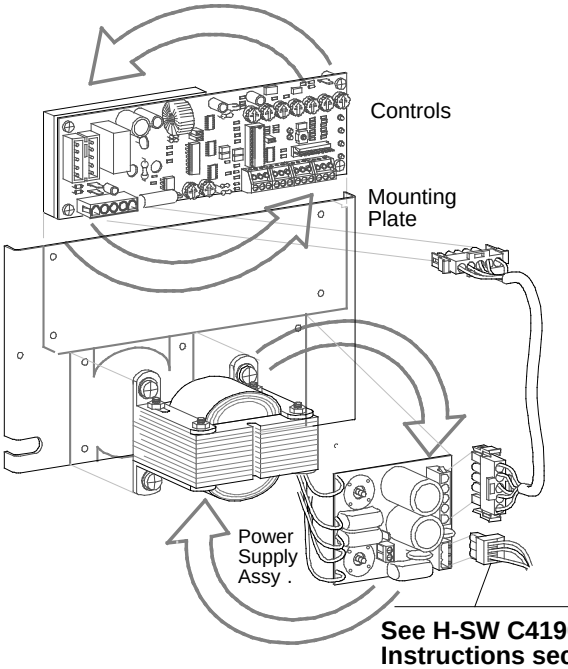
7th Step
Wire motor correctly for new hand.
Reinstall operator and adjust cams as necessary.

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..



See H-SW C4190 Set Up Instructions section 11 for wiring options and fire door requirements

15. 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.

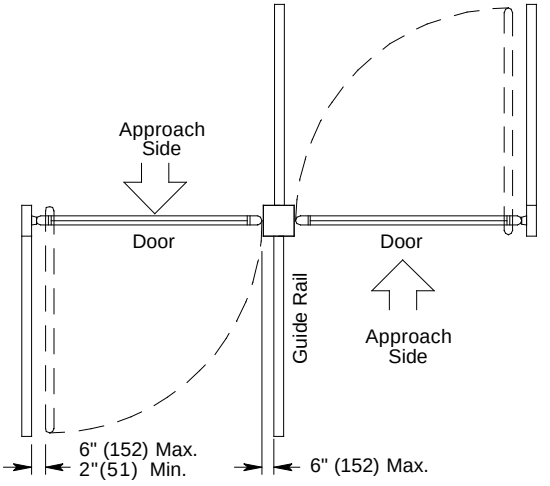
No Voltage Present, No operation:
No Voltage at CN2 pins 1 & 2, check fuse at the F2 location on the power supply.
A. Disconnect 120VAC plug, disconnect 5 pin power supply plug, and disconnect motor leads. Replace fuse.
B. Check motor for frame short or shorted motor. Checks good move on to step C.
C.Reestablish 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.

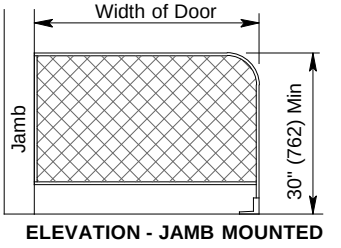
Voltage Present, No Operation:
Confirmation of switch circuits at CN2 can be made by watching led inputs.
A. First confirm D3 circuit is closed, green D3 light should be on. No light, check toggle circuit. A quick check of the circuit wiring can be made by jumping pins 5 & 6 of CN2.
B.Confirm that the 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.

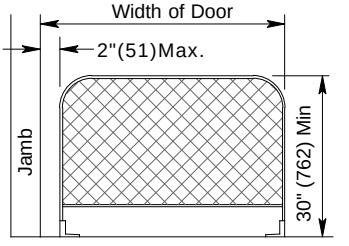
16. GUIDE RAIL INSTALLATION

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**

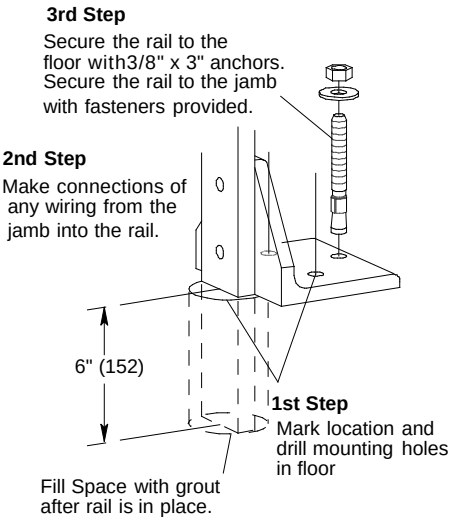




ELEVATION - JAMB MOUNTED



ELEVATION - FREE STANDING

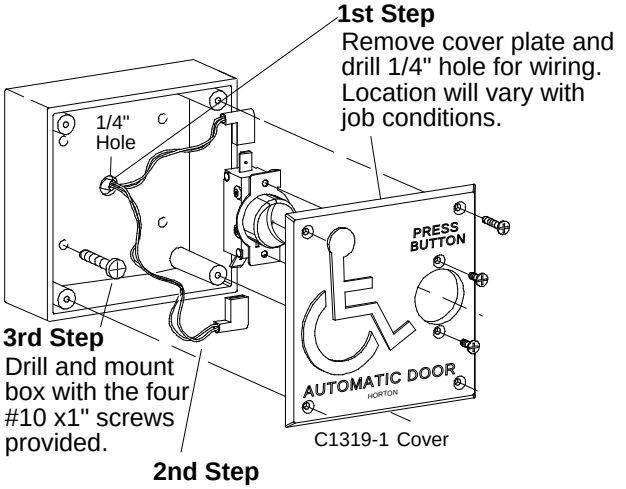


17. INSTALLING ACTUATION SWITCHES

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.

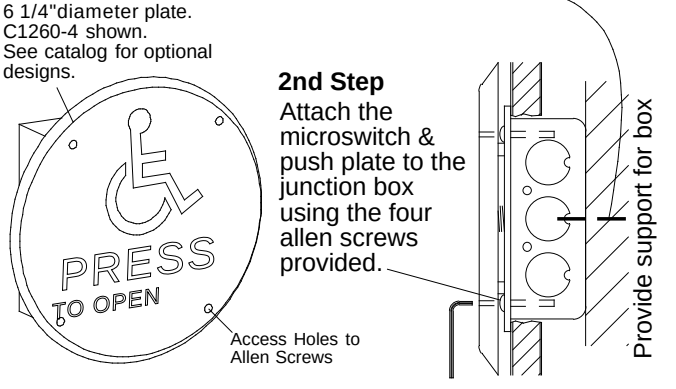
C1316-2 SWITCH ASSEMBLY

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.

18. S4900 FIRE DOOR OPERATOR

The following must be met to comply with UL requirements for Fire Rated Door Operators With Automatic Closers.

1 - Provisions must be furnished to remove power from the operator upon activation of the fire alarm.

2 - S4900 operator must be installed with UL approved "Fire Exit Hardware" type GXHX as found in the UL Building Materials Directory.

19. SAFETY DECALS (Per ANSI Specifications)

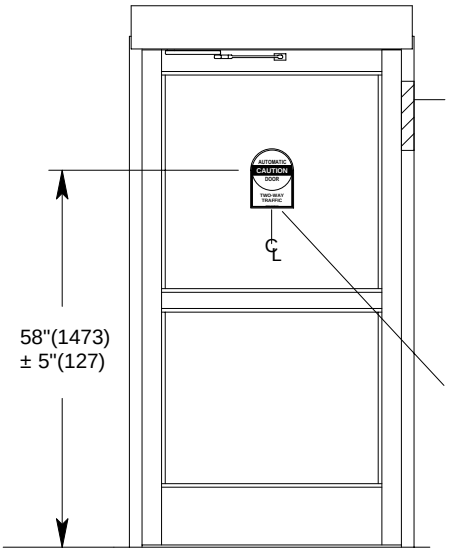
C1631-3: Two-sided decal for one-way traffic

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.

Horton AUTOMATICS

4242 Baldwin Boulevard
Corpus Christi,
Texas, U.S.A. 78405-3399
Tel: 800-531-3111, 361-888-5591
Fax: 800-531-3108, 361-888-6510
Internet: http://www.hortondoors.com

Horton Automatics, Ltd.
Unit A, Hortonwood 31
Telford, Shropshire, England TF1-4GS
Tel: 01952 670169, Fax: 0192 670181
International Tel: ++44-1952-670169
International Fax: ++44-1952-670181

A Division of Overhead Door Corporation, A Sanwa Shutter Company

Form G410, JULY 2004 printed in U.S.A.