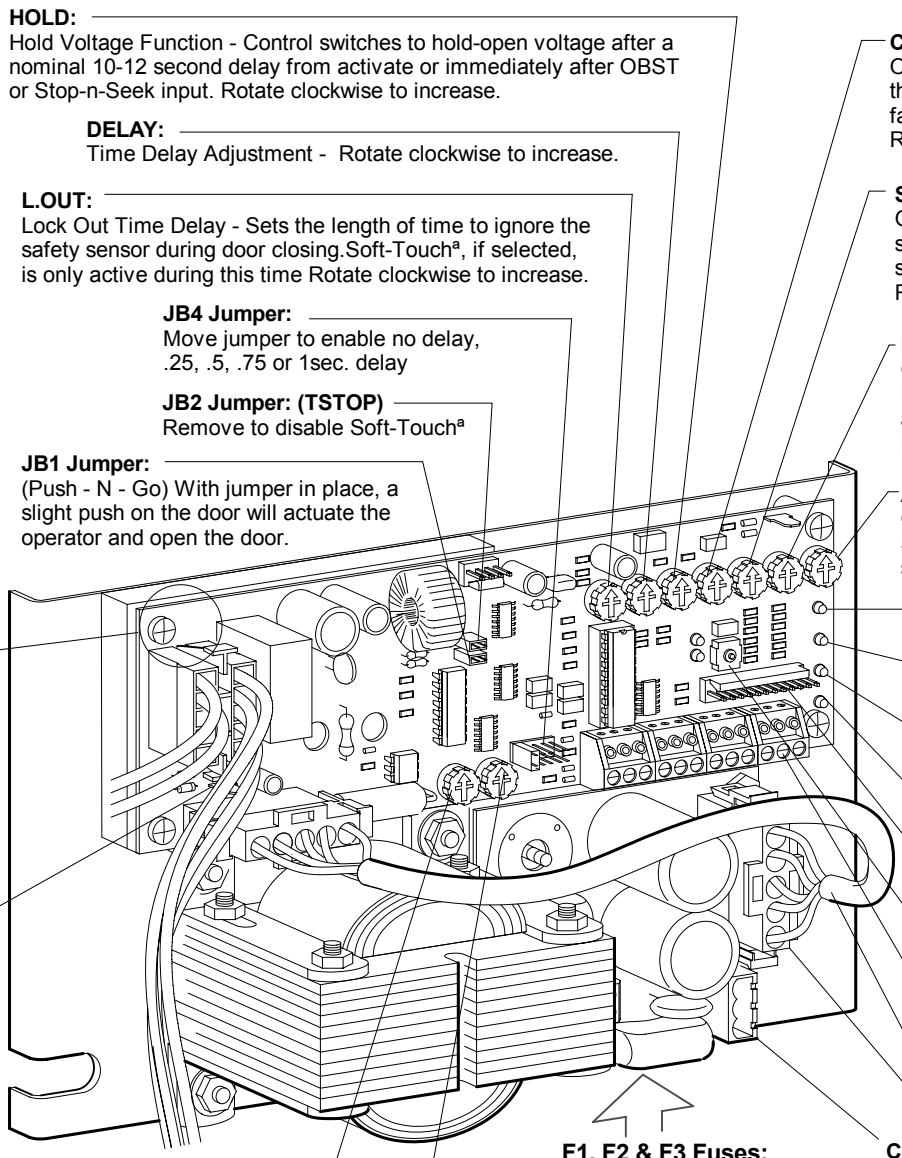
C4190 Control

for Swing & Folding Door Operators

*REVISION " J "

SETUP INSTRUCTIONS & TROUBLESHOOTING

To be used with either G410, G405, G710, G705 or G-BIF Installation Instructions



HOLD:
Hold Voltage Function - Control switches to hold-open voltage after a nominal 10-12 second delay from activate or immediately after OBST or Stop-n-Seek input. Rotate clockwise to increase.

DELAY:
Time Delay Adjustment - Rotate clockwise to increase.

L.OUT:
Lock Out Time Delay - Sets the length of time to ignore the safety sensor during door closing.Soft-Touch[a], if selected, is only active during this time Rotate clockwise to increase.

JB4 Jumper:
Move jumper to enable no delay, .25, .5, .75 or 1sec. delay

JB2 Jumper: (TSTOP)
Remove to disable Soft-Touch[a]

JB1 Jumper:
(Push - N - Go) With jumper in place, a slight push on the door will actuate the operator and open the door.

***Revision number location**

J1& J2

CHECK:
Open Check Speed Adjustment - Sets the speed after the open check switch falls onto the cam flat (approx 80 deg). Rotate clockwise to increase.

SPEED:
Open Speed Adjustment - Sets the open speed of the operator from start to open check. 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.

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

D4- Orange (SNR)
Stop-n-Resume CN2 pin 9

D3- Green (TGL)
Toggle CN2 pin 5

D2- Red (SAF)
Safety CN2 pin 4

D1- Green (ACT)
Activation CN2 pin 2

CN4 Connect to second control of pair

S 1 Activating switch

CN2
Switching Circuits

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

OBST: sensitivity to Obstruction: Rotate clockwise to increase.

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

CONTROL FEATURES:

- Swing-Stop™ initiated by Stop-n-Seek input (CN2 pin 10) from C8420-36 door mounted sensor, safety beam or similar device. This forces the control into a hold mode which causes the door to slow to a creep speed -see section 4

- Stop-n-Resume™ initiated by Stop-n-resume input (CN2 pin 9) from C8420-36 door mounted sensor, safety beam or similar device which causes the door to stop and freeze until Stop -n-Resume clears, then door resumes normal open speed.

- Soft-Touch™ Causes the door to re-open if it hits an obstruction prior to reaching close check.

- Push-n-Go™

- Lockout relay

- Support for magnetic & mortise locks

- 1 power supply for 2 - C4160-2 controls

- Control supports 1/8 or 1/4hp motors

- Power supply operates all sensors & most locks

- Adjustable open torque

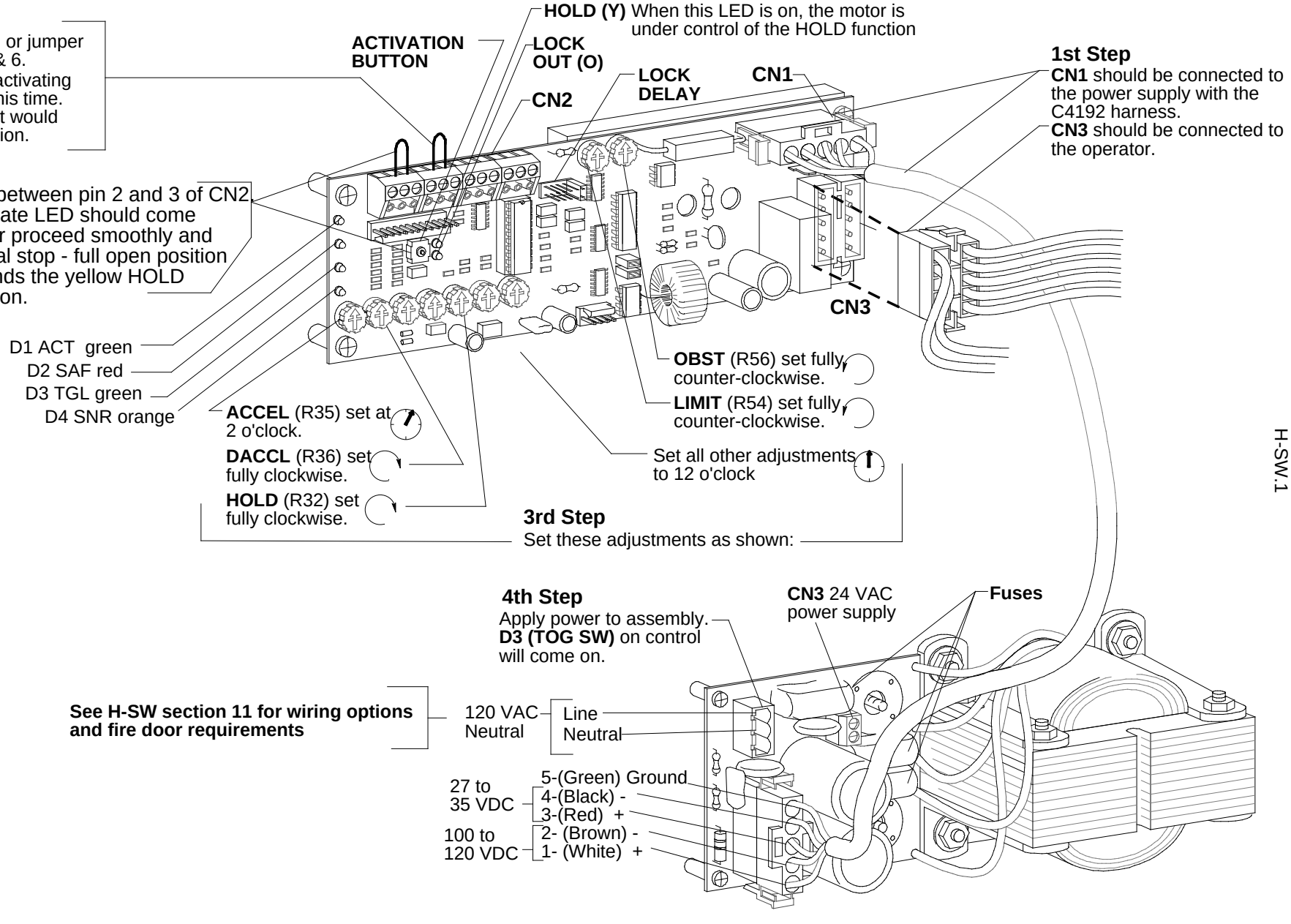
- Obstruction sensing

Horton AUTOMATICS

H-SW, SEPT. 2005

1. INSTALLATION AND SETUP OF THE C4160-2 CONTROL FOR 4000 AND 7000 OPERATORS

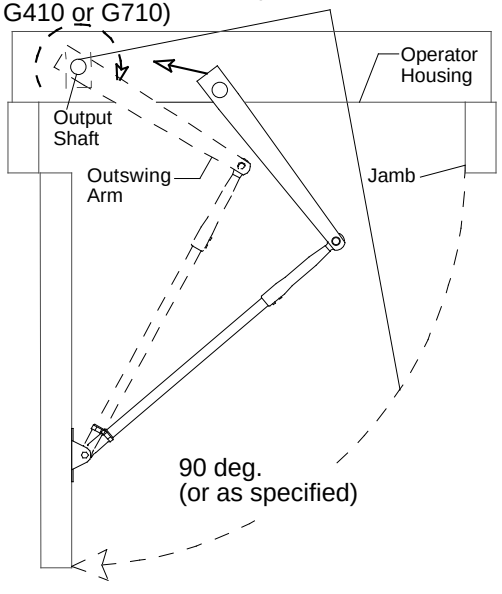
If this is a power operated pedestrian door with swing side protection (typically Horton's 4000 series) it must be adjusted according to ANSI/BHMA 156.10.
If this is a low energy power operated door (typically Horton's 7000 series) it must be adjusted according to ANSI/BHMA 156.19.

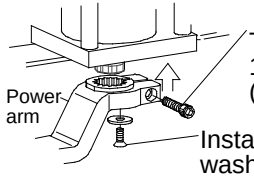


2. CAM SETTINGS

1st Step

With the operator powered open against the internal stop -manually move the door to its full open position (normally 90 deg from closed) and install the arm on the operator shaft and door.(See G410 or G710)



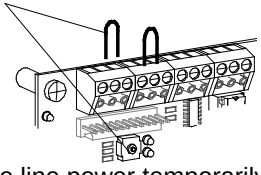


Tighten bolt to 10 foot pounds (13.5N)

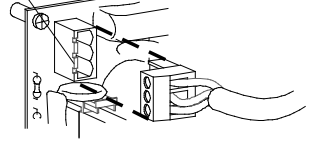
Install the screw and washer in the end of the shaft.

2nd Step

Remove the jumper between terminals 2 and 3 of CN2 and allow the door to close. Or release the activation button.

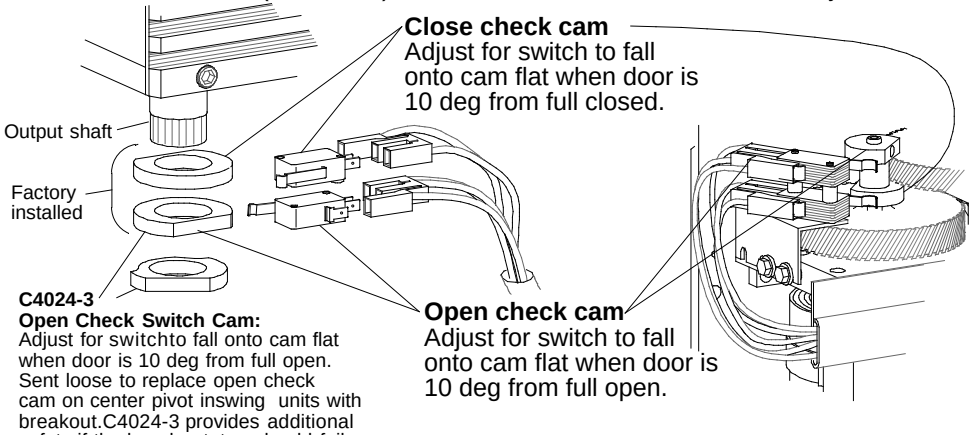


Remove line power temporarily for cam settings.



3rd Step

Push door open slowly and allow it to close while observing the operation of the open and close check cams (see below). Use a 3/32" ball end hex wrench to adjust the cams.



Close check cam
Adjust for switch to fall onto cam flat when door is 10 deg from full closed.

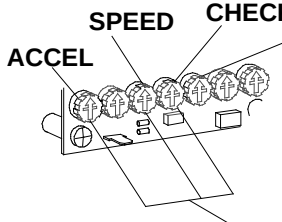
Open check cam
Adjust for switch to fall onto cam flat when door is 10 deg from full open.

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 inswing units with breakout.C4024-3 provides additional safety if the breakoutstop should fail.

- In Horton series 4000 and 7000 operators, the cams release the switch arms when it's time to reduce the doors speed.
  - -Rotate a cam further in the direction normally traveling to increase the check zone.
  - -Rotate a cam in the opposite direction to decrease the zone.
- The adjustment of the open check cam is relatively critical to proper door operation.
  - -It may be necessary to increase the open check zone if a very fast open speed or slow deceleration is used.
  - -A smaller open check zone may acceptable if the door is being operated slowly .

3. CONTROL ADJUSTMENTS (open and close speeds)

Throughout the remaining steps, "cycle the door" means to press the activation botton or apply a jumper between pin 2 and 3 of the terminal block CN2 to activate the door to open.



1st Step

- Set **HOLD** pot R32 fully counter-clockwise.
- Apply line power and cycle the door.
  The door should open smoothly and quickly, and then close after a brief delay.

2nd Step

Activate the door again and adjust the opening characteristics.

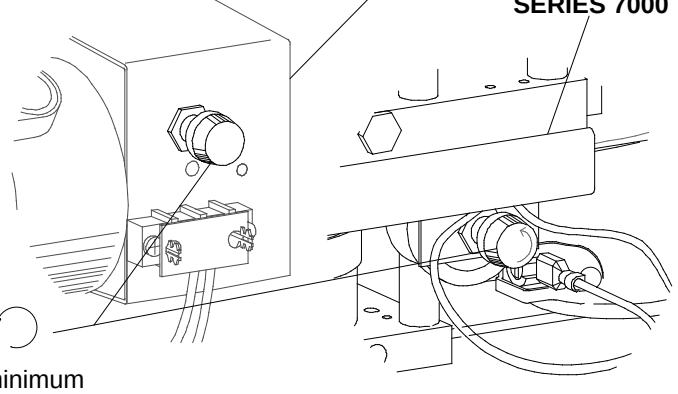
ACCEL pot R35 clockwise to increase

SPEED pot R38 clockwise to increase

CHECK pot R30 clockwise to increase

3rd Step

- Cycle the door.
- Use the adjustment knob located on the operator to adjust the closing speed as required.
  The close check speed (speed of the door closing after the close check switch is released) is fixed and cannot be adjusted.

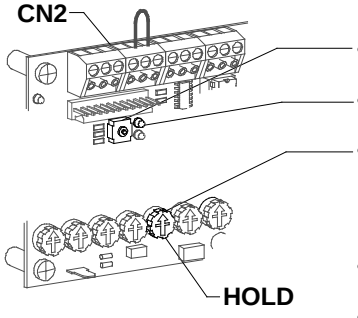


Closing speed adjustment rotate counter-clockwise to increase.
Suggested setting: 4 sec. minimum

H-SW.2

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.

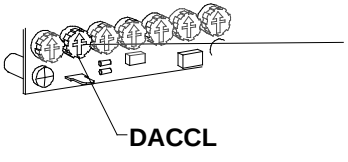
4. CONTROL ADJUSTMENTS (hold function)



•Cycle the door, and hold the activation button. The door should open fully.
•After 10 - 12 seconds the yellow **HOLD** indicator should come on.
•At this point the door will begin drifting slowly back toward the closed position.
Adjust the **HOLD** pot R32 to stop the drift and allow the door to slowly seek the open position.

•Release the activation button and allow the door to close.
•Cycle it again. The door should now maintain the full open position without drifting after the yellow **HOLD** indicator comes on.(see sect. 7)

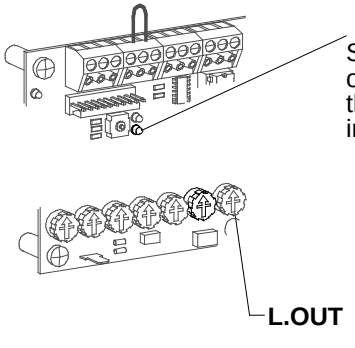
5. CONTROL ADJUSTMENTS (deceleration and lock out)



1st Step

If the door slows down too fast when switching from open speed to open check, **DACCL** pot **R36** may be turned down (counter-clockwise) as required.

NOTE:
To provide the quickest response to an obstruction,Horton recommends that DACCL be left at maximum on all low-energy installations without additional safety devices, or on installations where the Swing-Stop™ or Stop and Resume™ features are used.



2nd Step

Set **L.OUT** pot **R22** (Lockout delay) so that the orange **LOCK OUT** indicator stays on throughout the door closing and does not go out untill immediately after the door completely closes.

Rotate clockwise to increase.

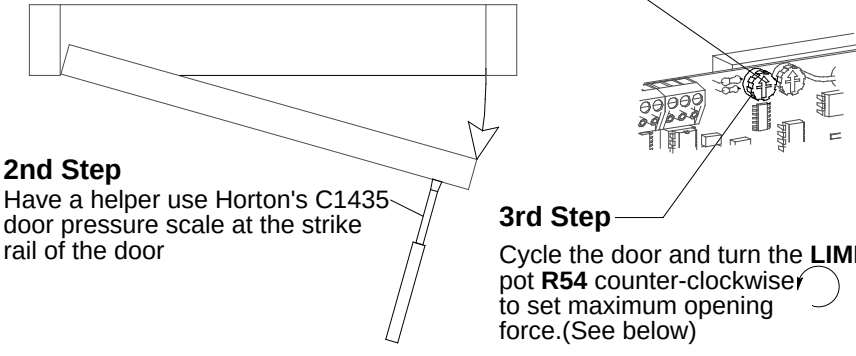
NOTE:
This step must be performed even if a swing side safety sensor is not used.

6. CONTROL ADJUSTMENTS (opening force)

The following adjustment is mandatory on low- energy operators without additional safety sensors (typically, series 7000 operators).
It is optional, but highly recommended for maximum safety and control / operator protection, on series 4000 operators.

1st Step

Set the **LIMIT** pot **R54** fully clockwise.



2nd Step

Have a helper use Horton's C1435 door pressure scale at the strike rail of the door

3rd Step

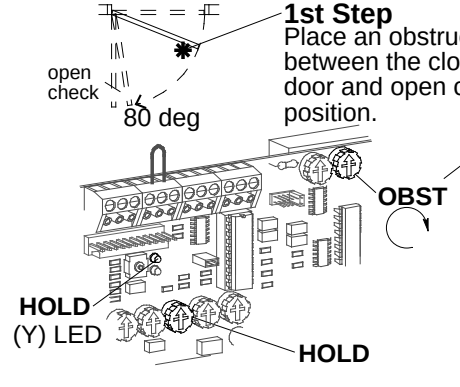
Cycle the door and turn the **LIMIT** pot **R54** counter-clockwise to set maximum opening force.(See below)

Low energy power operated swing doors series 7000 and 4000LE
The maximum force is 15 lb. (6.8kg) or less to comply with ANSI 156.19

Power operated swing doors series 4000
The maximum recommended opening force is 35-50 lb. (15.9-22.7 kg) unless there are requirements for a higher force.

NOTE:
•If more than 10 to12 seconds lapses while you are trying to measure the opening force, the control will automatically switch to to the hold open mode. If this occurs, allow the door to close, then cycle it again.
•If the limiting force is set very light, the door may have difficulty opening in windy or adverse conditions.

7. CONTROL ADJUSTMENTS (obstructions)



1st Step

Place an obstruction between the closed door and open check position.

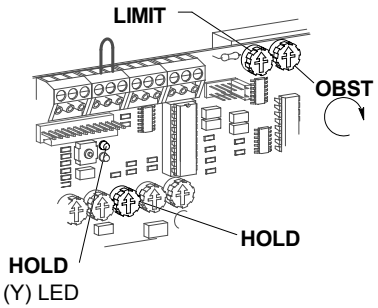
2nd Step

Cycle the door and adjust the **OBST** pot **R56** clockwise untill the **HOLD** indicator lights and switches to the hold-open mode.

With the hold-open adjustment made in section 4, any obstruction encountered will stop the door until the time delay expires and all safety devices clear - then the door will close.

7. CONTROL ADJUSTMENTS (obstructions) CON'T

The obstruction response does not occur until approximately one second after an obstruction is encountered. This prevents false response from wind gusts, etc.

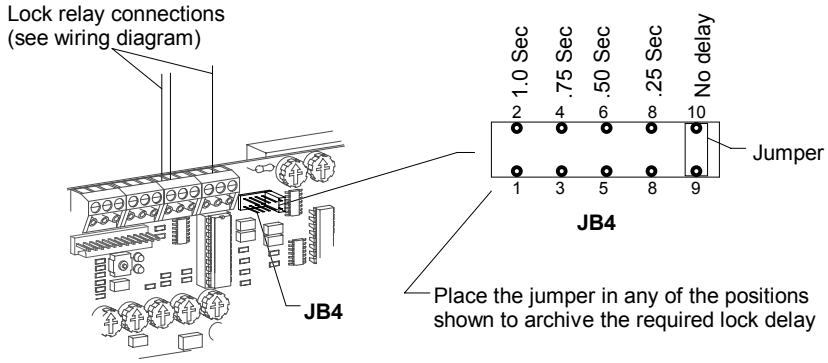


If a presence detector is installed on the swing side of the door, an obstruction response will "hang up" the presence detector and the door, until the door can get to the full open position.

It is recommended that these installations have the **HOLD** adjustment **R32** increased sufficiently to get the door to creep slowly open after encountering an obstruction.

It may not be possible to get the obstruction response if the **LIMIT** adjustment **R33** is set very light (16lb. - 7.3kg or less)
See section 6

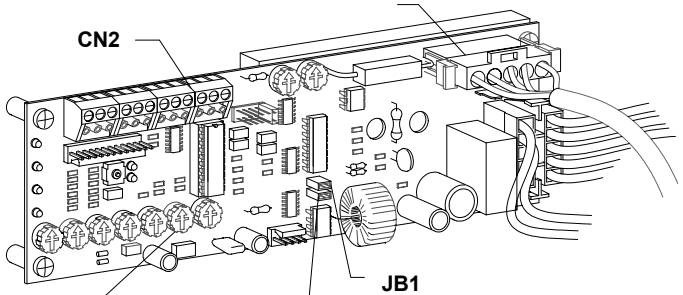
8. CONTROL ADJUSTMENTS (lock delay)



3rd Step

Wire the lock to a Horton C3881 auxiliary relay module as per diagram 11380.6.
Connect the C3881 to CN2 as shown.
Cycle the door and check for proper lock operaton.

9. CONTROL ADJUSTMENTS (time delay & push-n-go)



DELAY

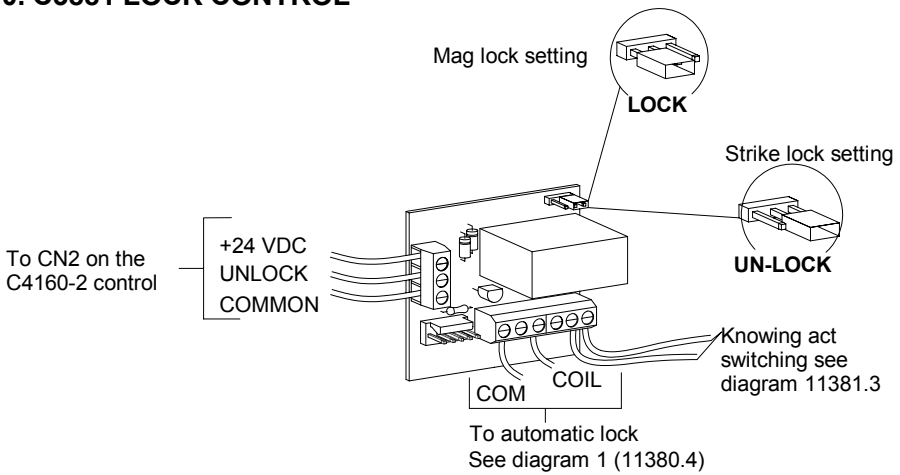
Rotate clockwise to increase

Set the **DELAY** pot **R46** for the desired time delay and check all accessory devices for proper operation.

JB1
Remove jumper JB1 if the PUSH-N-GO feature is to be disabled.
Push-n-go is normally left on in low energy (series 7000) operator applications and turned off otherwise.

JB2
(TSTOP)
Reopens the door if an obstruction is encountered before close check.
Remove **JB2** to disable this feature.

10. C3881 LOCK CONTROL

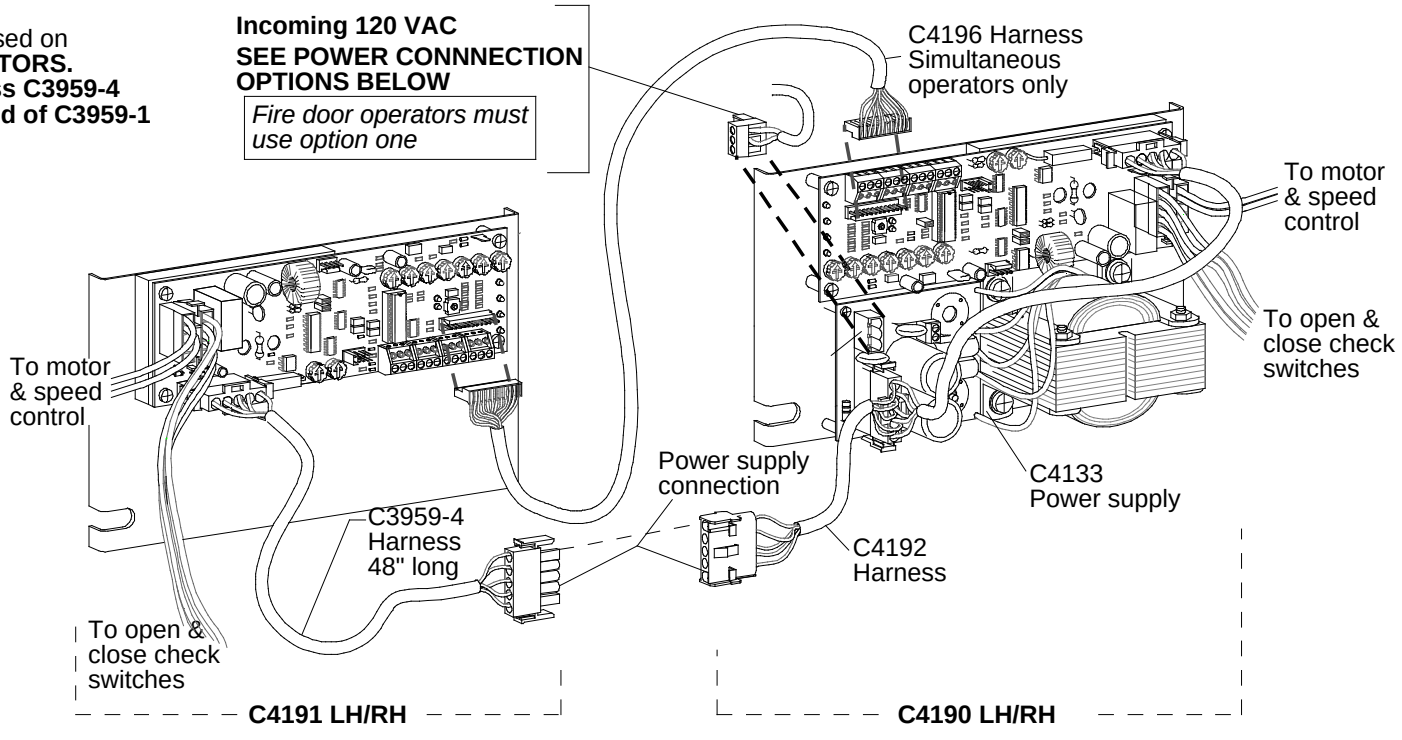


NOTE:
This control will provide power for most **25VDC** magnetic locks and strikes. **Do not use on 12 volt DC locks** (see diagram 11380.6)

11. DUAL CONTROLS & FIELD WIRING OPTIONS & REQUIREMENTS

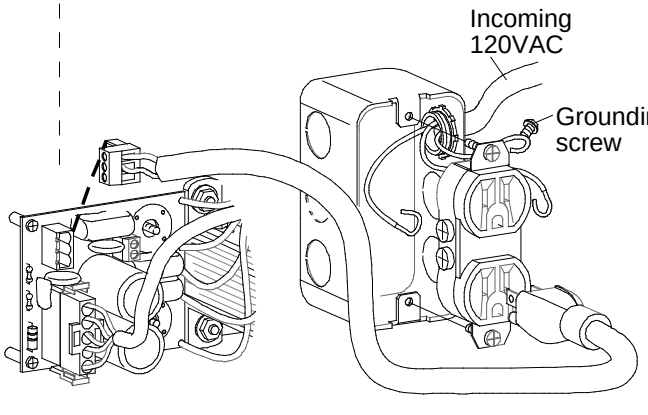
Set up the controls as outlined in the previous sections and make the connections as shown on this page.

NOTE:
C4196 harness is **ONLY** used on **SIMULTANEOUS OPERATORS. The power supply harness C3959-4 and C4192 are used insted of C3959-1 on pairs.**

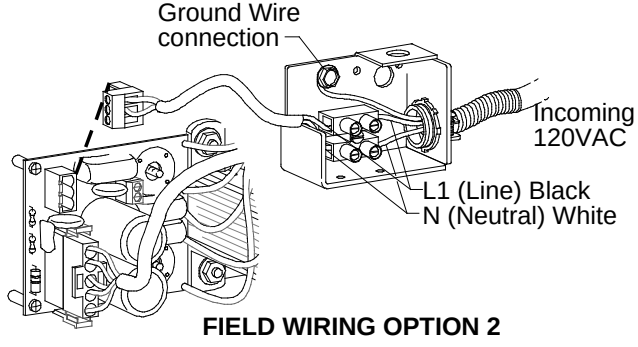


H-SW.5

FIELD WIRING OPTIONS AND REQUIREMENTS

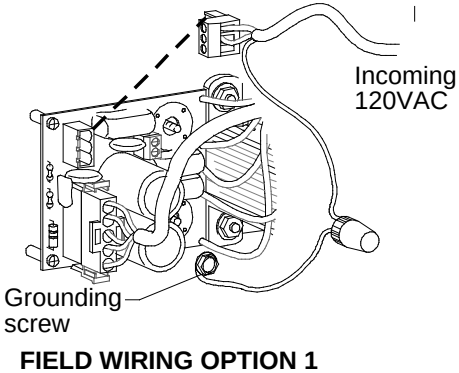


FIELD WIRING OPTION 3



FIELD WIRING OPTION 2

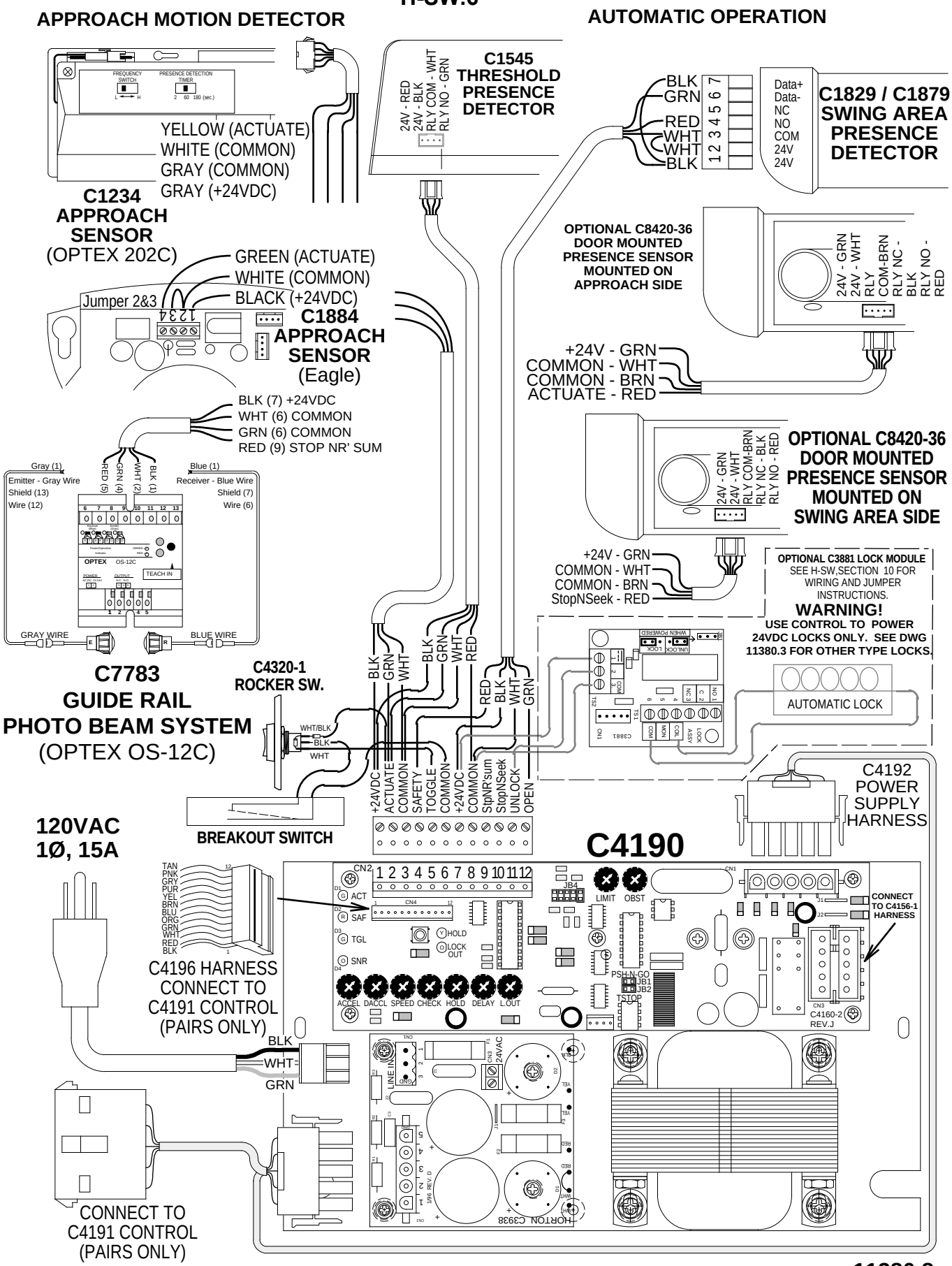
This wiring option may be used on any swing door installation.....
it *MUST* be used on fire door operators



FIELD WIRING OPTION 1

If operator is to be used as a S4900 or an S7900 fire door operator, connections must be in accordance with NFPA 72 and artical 760 of NEC.

4.142d3



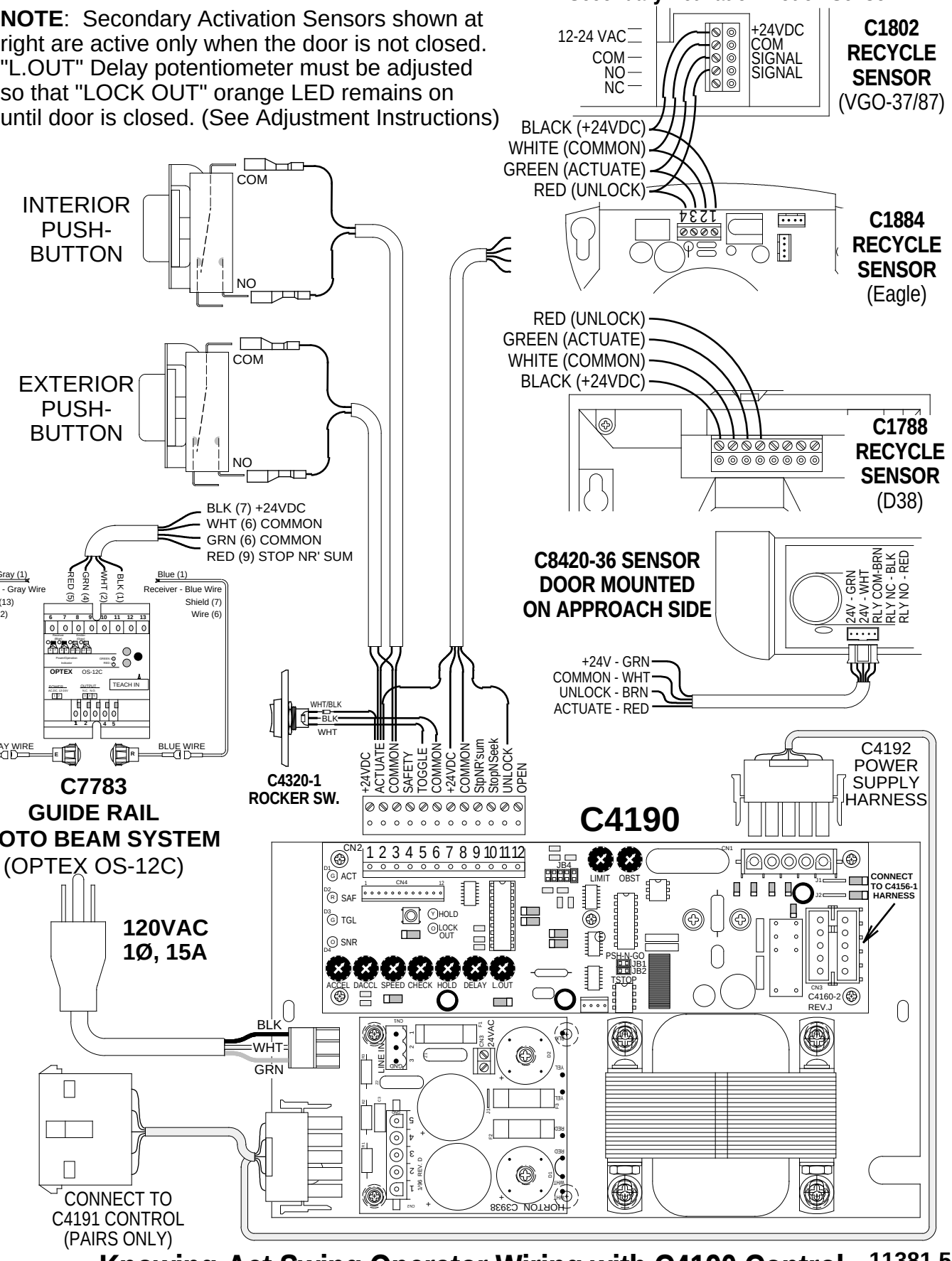
Automatic Swing Operator Wiring with C4190 Control REV."J"

11380.8
01SEP05JAL

4.143d1

KNOWING-ACT OPERATION

NOTE: Secondary Activation Sensors shown at right are active only when the door is not closed. "L.OUT" Delay potentiometer must be adjusted so that "LOCK OUT" orange LED remains on until door is closed. (See Adjustment Instructions)



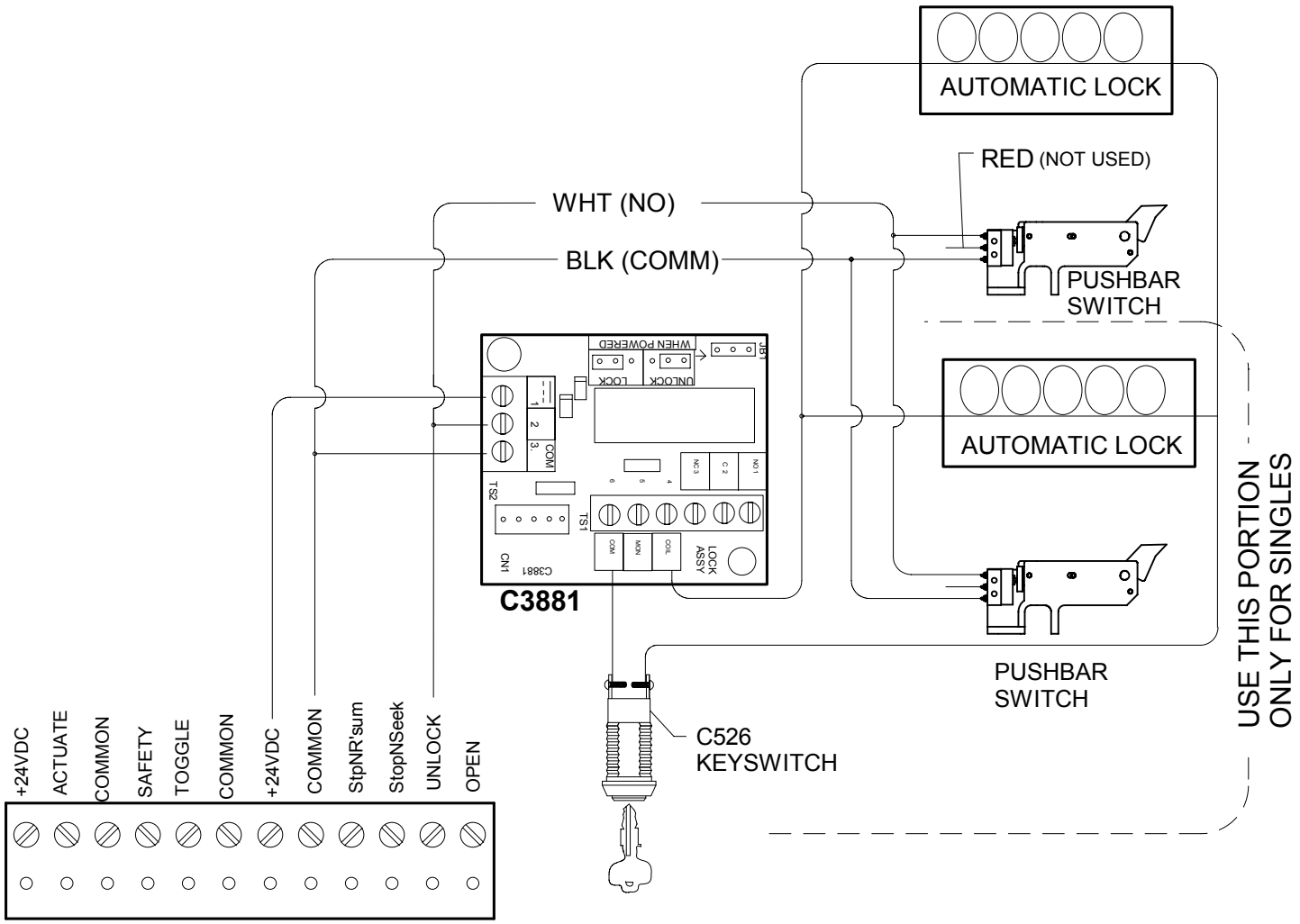
Knowing-Act Swing Operator Wiring with C4190 Control

11381.5
01SEP05 JAL

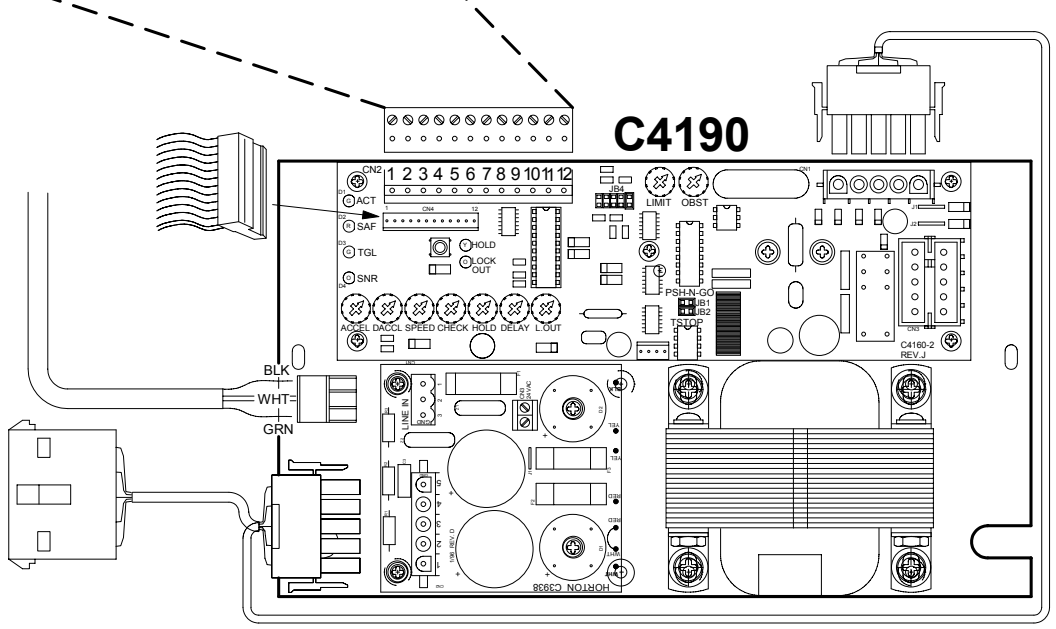
Automatic Folding door Operator Wiring with C4190 Control REV. "J"
FOR SINGLE AND PAIRS

OPTIONAL C3881 LOCK MODULE SEE H-SW PAGE H-SW.4 FOR WIRING AND JUMPER INSTRUCTIONS.

WARNING !
USE CONTROL TO POWER 24VDC LOCKS ONLY

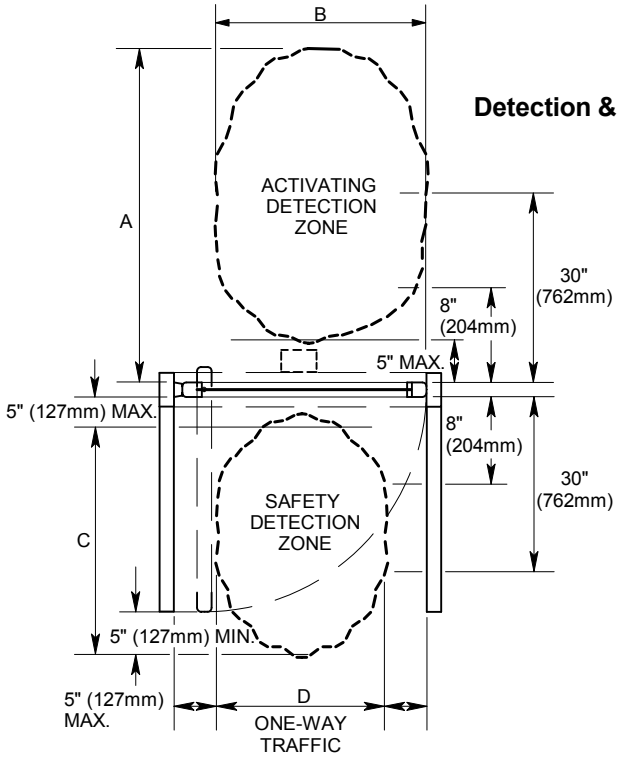


SEE PAGES H-SW.6 & H-SW.7 FOR WIRING OF ACTIVATION and SWITCHES



APPENDIX A ACTIVATION AND SAFETY ZONES (swing)

The following general information is provided as a recommendation for safe operation. See **ANSI 156.10-2005** for complete information for swing door activation, safety zones and guide rail layouts. See manufacturers instructions for installation and adjustments of motion and presence detectors.



Detection & Safety Zones - Header Mounted Safety Sensors

A = MINIMUM ACTIVATING DETECTION ZONE LENGTH.
B = MINIMUM ACTIVATING DETECTION ZONE WIDTH.
C = MINIMUM SAFETY DETECTION ZONE LENGTH.
D = MINIMUM SAFETY DETECTION ZONE WIDTH.

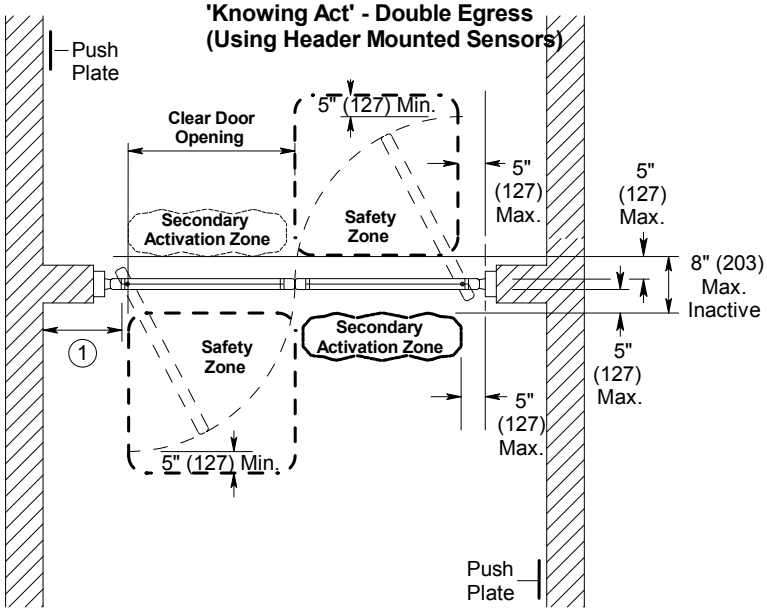
REF. 8.2.2.2 FOR REQUIREMENT FOR A SAFETY BEAM OR PRESENCE DETECTION ON THE SAFETY ZONE SIDE OF THE DOOR

APPENDIX A1 ACTIVATION AND SAFETY ZONES (knowing act)

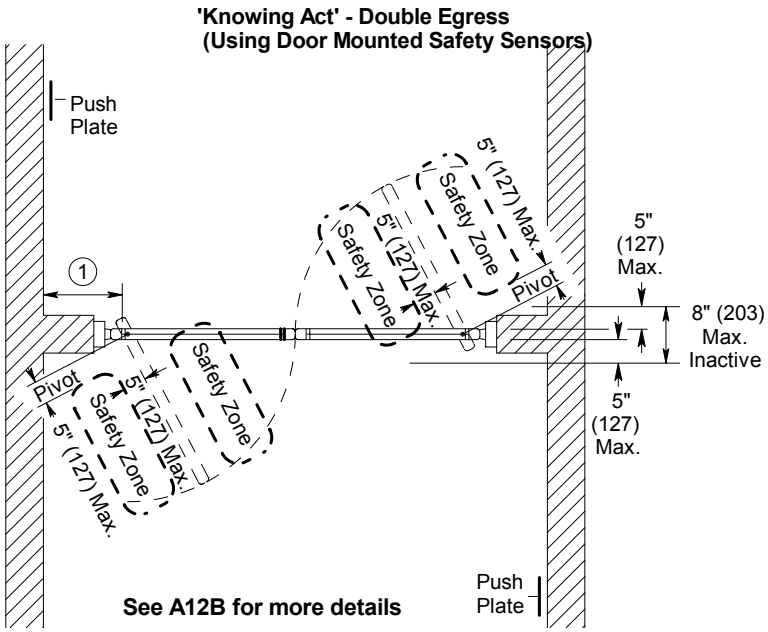
The following general information is provided as a recommendation for safe operation. See **ANSI 156.10-2005, SECT. 9** for compliance.

Push Plate Switch Activation:
After push plate is pressed & released door to remain open a minimum of five seconds.Switch to be installed within view of door at a maximum distance of 144" (305mm) from the center of door and mounted a minimum of 36" (914mm) and maximum 48" (1219mm) from finished floor.

'Knowing Act' - Double Egress (Using Header Mounted Sensors)



'Knowing Act' - Double Egress (Using Door Mounted Safety Sensors)



See A12B for more details

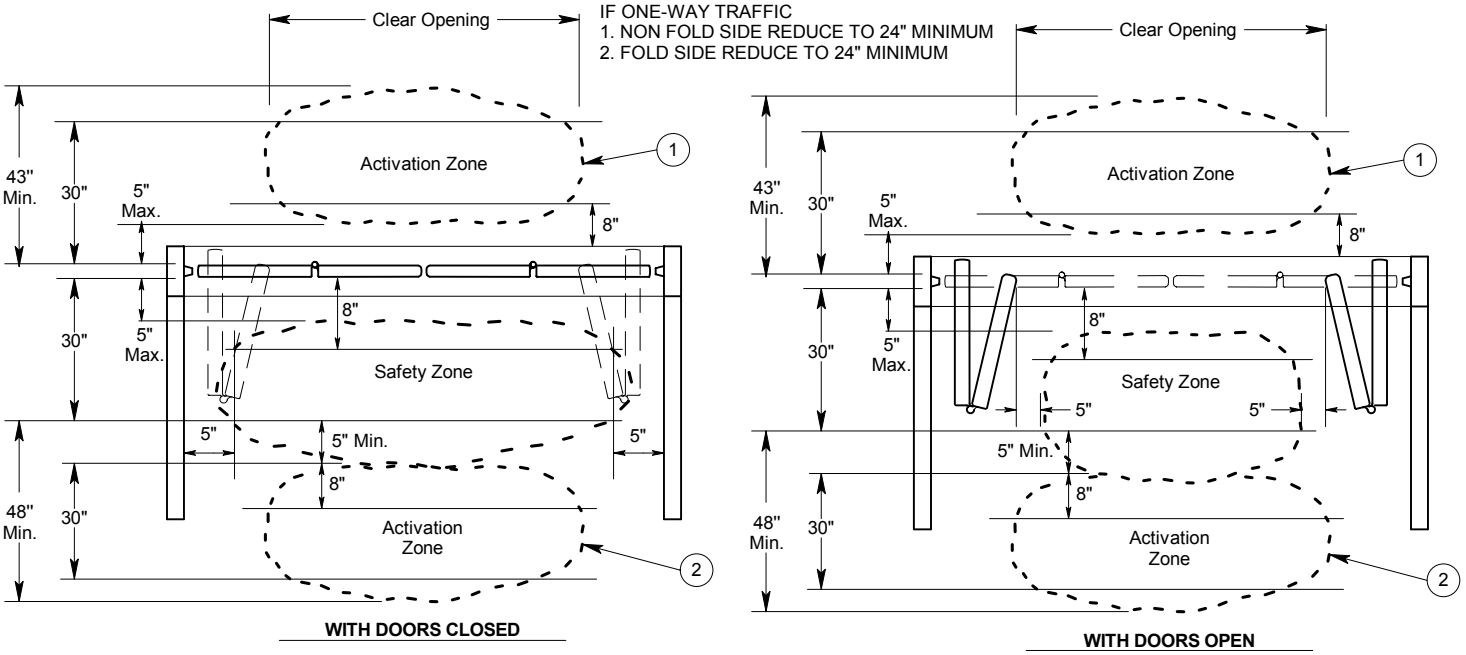
Push Plate Switch Activation:
After push plate is pressed & released door to remain open a minimum of five seconds.
Switch to be installed within view of door at a maximum distance of 144" (3658mm) from the center of door and mounted a minimum of 36" (914mm) and maximum 48" (1219mm) from the finished floor.

(1) SWING DOOR IN HALL WAY UTILIZING KNOWING ACT ACTIVATING DEVICE MAX. 10" WITHOUT ADDING A GUIDE RAIL

APPENDIX A2 ACTIVATION AND SAFETY ZONES (folding)

The following general information is provided as a recommendation for safe operation. **See ANSI 156.10-2005 for standards compliance** of folding door activation, safety zones, guide rails and mat layouts. See manufacturers instructions for installation and adjustments of motion and presence detectors.

PAIR OF FOLDING DOORS WITH 2-WAY TRAFFIC.



Note: Detection zones shown are approximate and are for illustration purpose only.

If push button activation (knowing act) is used see ANSI 156.10 sect. 9 for secondary activation and safety zones.

APPENDIX A3 OPERATOR ADJUSTMENTS FOR CODE COMPLIANCE (ANSI 156.10)

The following information is provided as a recommendation for safe operating speed adjustments and should be adhered to when installing or servicing swing and folding door operators.

Opening Force: (Swing & Folding) Shall not exert more than 40 ft.lb (180N) through the last 10 deg (open check), measured 1" (25) from the lock edge on swing doors and 1" from the lead edge of the FS leaf.

Closing Force: (Swing) Shall not exert more than 30 ft.lb. (180N) at any point in the closing cycle, measured 1" (25) from the lock edge of the door.

Closing Force: (Folding) Shall not exert more than 30 ft.lb. (133N) at any point in the closing cycle.

Opening Speed: (Swing & Folding) The opening time of a power operated door to open check shall not be less than 1.5 seconds.

Closing Speed: (Folding) maximum 1ft / second

Closing Speed: (Swing) 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)					2.8 sec	3.2 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.

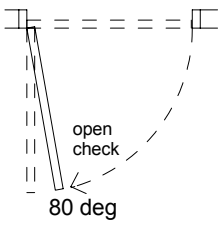
ANSI CHART - OPENING & CLOSING TIME IN SECONDS (LOW ENERGY)

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.

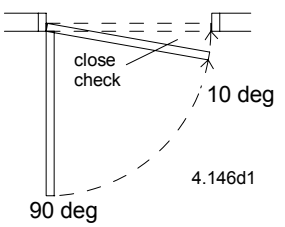
Power Failure: manual pressure not to exceed 15 lb ft (111N) at a point one inch (25mm) from the latch edge (may vary by local code).

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



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

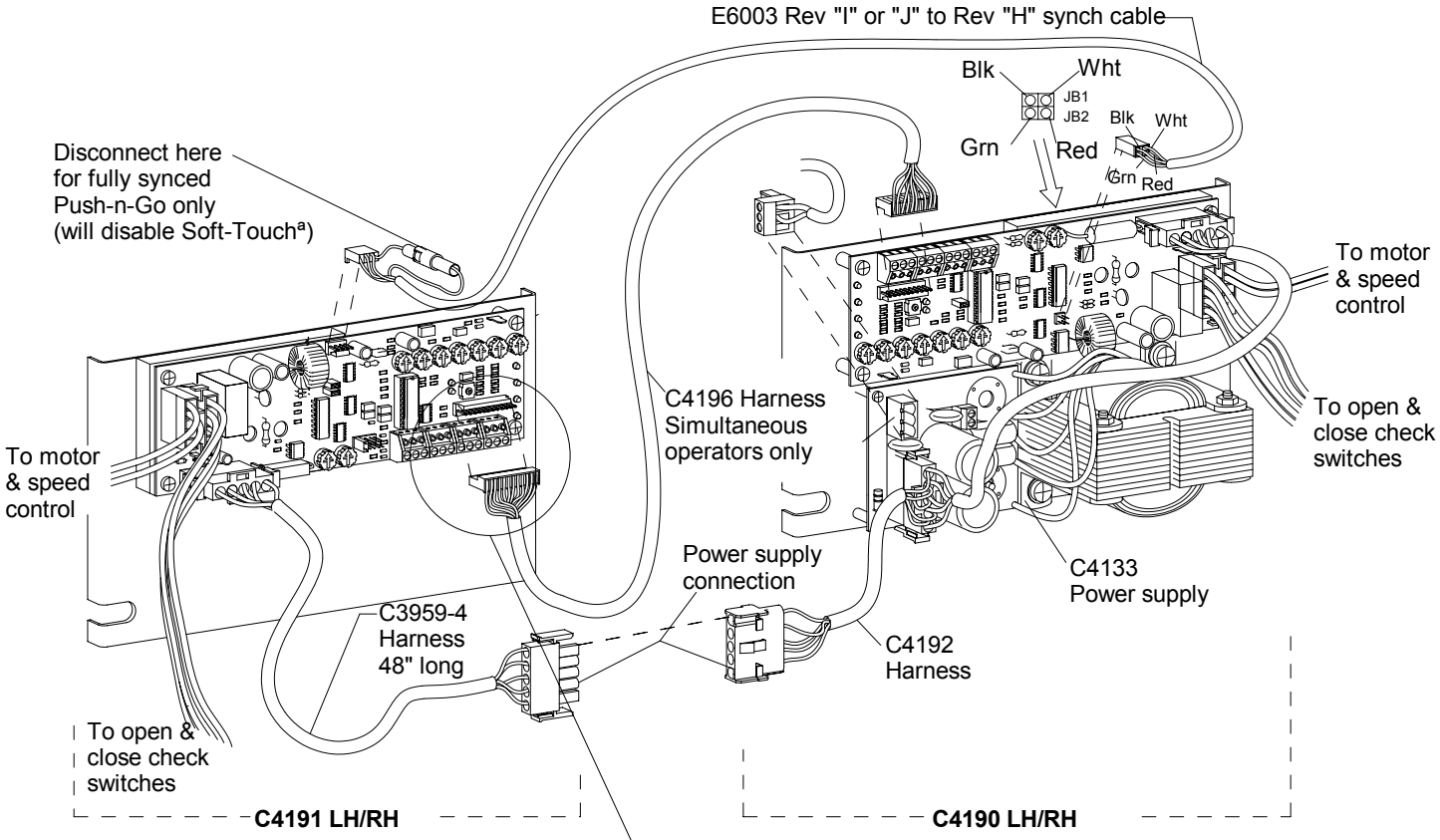
The door shall remain fully open for at least 5 sec. unless a sensing device is used.

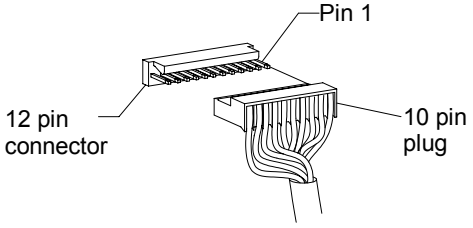


CLOSING TIME:
Doors shall be field adjusted to close from 90 to 10 deg in three sec. or longer. Doors shall close from 10 deg to fully closed in 1.5 sec. or more.

APPENDIX B CONNECTING A REV. "H" BOARD TO A REV. "I" OR "J" BOARD

The connections shown are for use on **SIMULTANEOUS OPERATORS ONLY.**





NOTE:

If a 10 pin plug is connected to a 12 pin connector pin 1 on the connector must line up with pin 1 on the plug

OR...

If a 12 pin plug is connected to a 10 pin connector pin 1 on the connector must line up with pin 1 on the plug

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