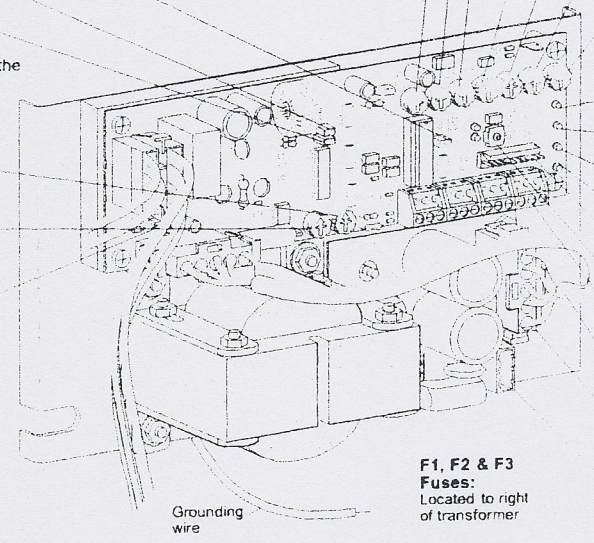
C4190
Setup Instructions
for Swing & Folding doors



JB3 Jumper:
(Remove jumperto enable lock delay). Inserts a 0.25 second delay to allow the lockto release before the door starts to move.

JB2 Jumper:
(TSTOP)
Removeto disable touch stop

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

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

OBST: sensitivity to Obstruction:
Rotate clockwise to increase.

J1& J2

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

DELAY:
Time DelayAdjustment - Rotate clockwise to increase.

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

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

SPEED:
Open Speed Adjustment - Sets the open speed of the operator from start toopencheck.
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 CN2pin 9

D3- Green (TGL)
Toggle CN2pin 5

D2- Red (SAF)
Safety CN2pin 4

D1- Green (ACT)
Activation CN2pin 2

CN4 Connect to second control ofpair

S 1 Activating switch

CN2
Switching Circuits

C3959-1
5 pin Power SupplyLace

CN2
Power Supply

CN1 Power in:
120 VAC,15Amp.

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

Grounding wire

These features are included:
- **Lockout relay**
- **Obstruction sensing**
- **Push-n-Go™**
- **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.This is primarily a European feature and not recommended for U.S. markets.
- **Soft-Touch™** Causes the door to re-open if it hits an obstruction prior to reaching close check.
- 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

Horton
AUTOMATICS

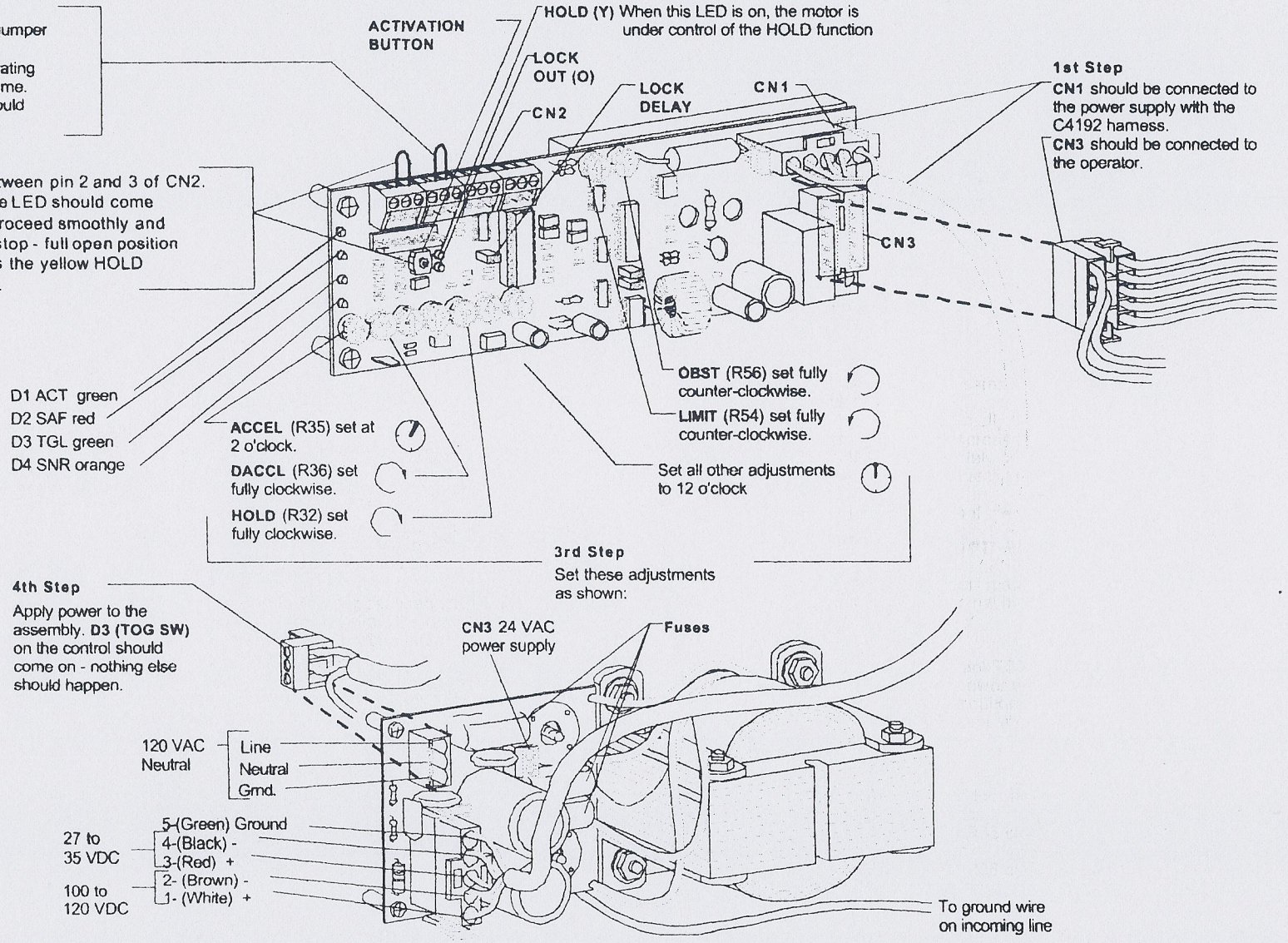
H-SW, JAN2001

4 136d2

CONTENTS

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.



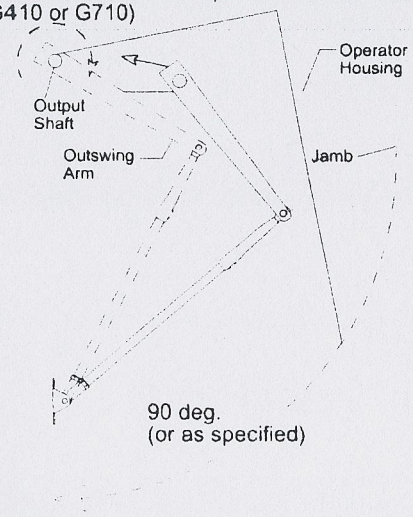
H-SW.1

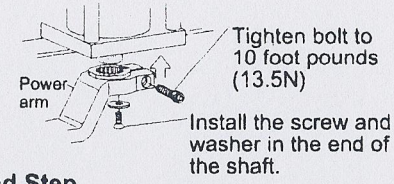
4138d2

2. CAM SETTINGS

1st Step

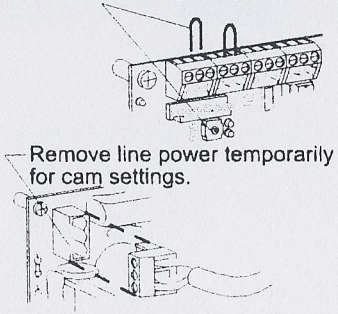
With the operator powered open against the internal stop -manually move the door to its full open position (normally 90 deg from closed) and install the arm on the operator shaft and door.(See G410 or G710)





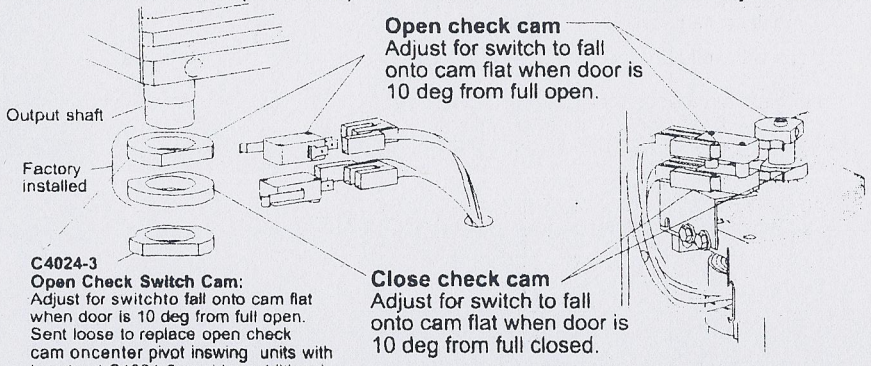
2nd Step

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



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.

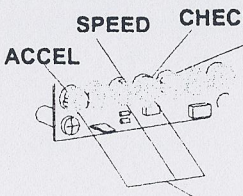


C4024-3
Open Check Switch Cam:
Adjust for switchto fall onto cam flat when door is 10 deg from full open. Sent loose to replace open check cam oncenter pivot inswing units with breakout.C4024-3provides additional safety if the breakoutstop should fail.

- 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 it's 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.

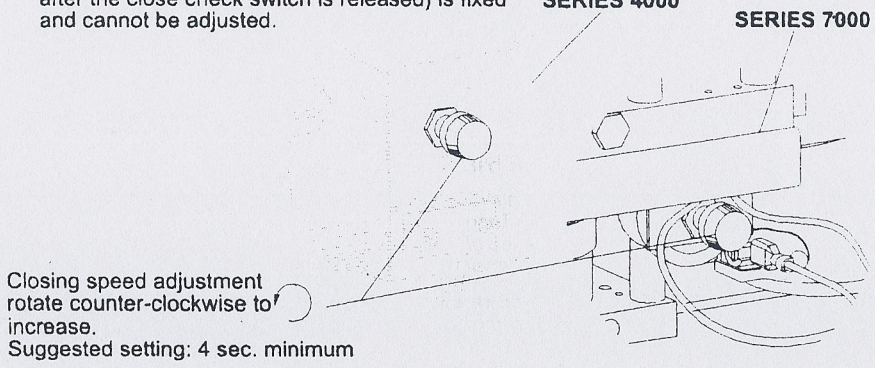
ACCEL pot R35 clockwise to increase

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.



H-SW2

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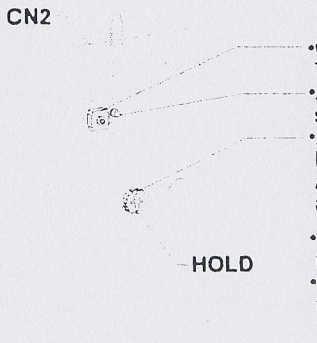
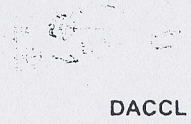
CAUTION: When installing the power arm or when servicing any swing door operator, be sure to keep your face, hands and arms clear of the power arm's swing path. **SERIOUS INJURY** could result should the operator be accidentally activated to an open position or should the operator return to a relaxed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

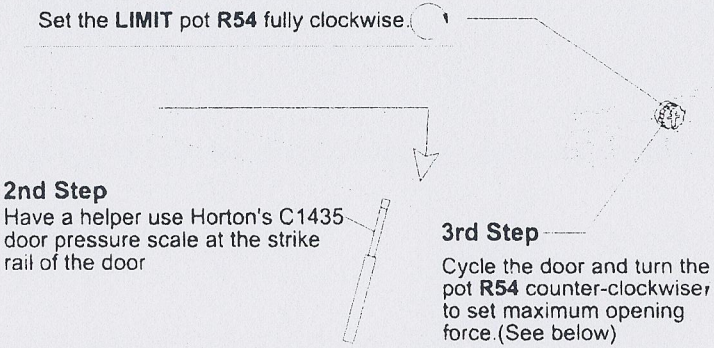
4 1400d1

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

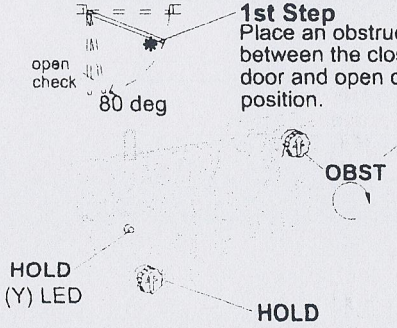
Cycle the door and turn the **LIMIT** pot **R54** counter-clockwise to set maximum opening force.(See below)

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

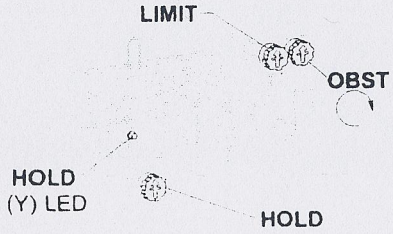
Cycle the door and adjust the **OBST** pot **R56** clockwise untill the **HOLD** indicator lights and switches to the hold-open mode.

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.

H-SW.3

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.



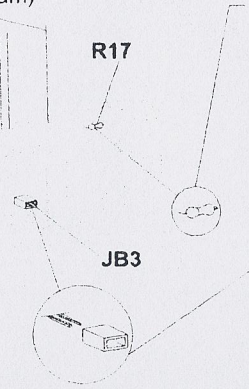
If a presence detector is installed on the swing side of the door, an obstruction response will "hang up" the presence detector and the door, until the door can get to the full open position.

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)

Lock relay connections
(see wiring diagram)



2nd Step

If the lock requires more than .25 seconds to release (magnetic locks typically require .5 seconds or more), locate resistor **R17** and carefully cut it out.
This increases the unlock delay to about .75 seconds and should allow proper operation with all locks.

1st Step

If a lock relay is to be used, remove jumper block **JB3.** (Lock delay enable)
This inserts a .25 sec delay to allow the lock to release before the door starts moving.

3rd Step

Wire the lock to a Horton C3881 auxiliary relay module as per diagram 11380.4.
Connect the C3881 to CN2 as shown.
Cycle the door and check for proper lock operaton.

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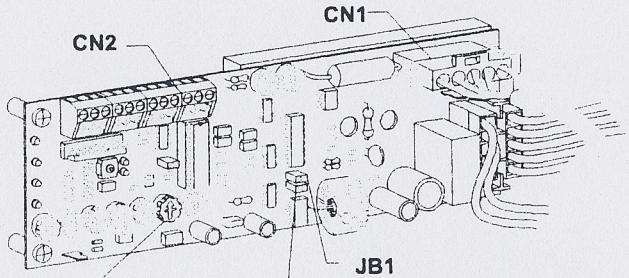
9. CONTROL ADJUSTMENTS (time delay & push-n-go)



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.

DELAY

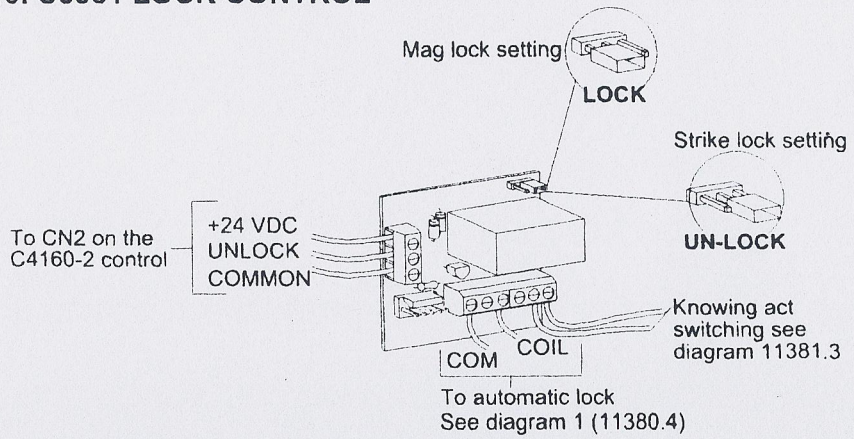
Rotate clockwise to increase

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

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

H-SW.4

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 11380.4)

11. DUAL CONTROLS

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 C4192are used insted of C3959-1 on pairs.

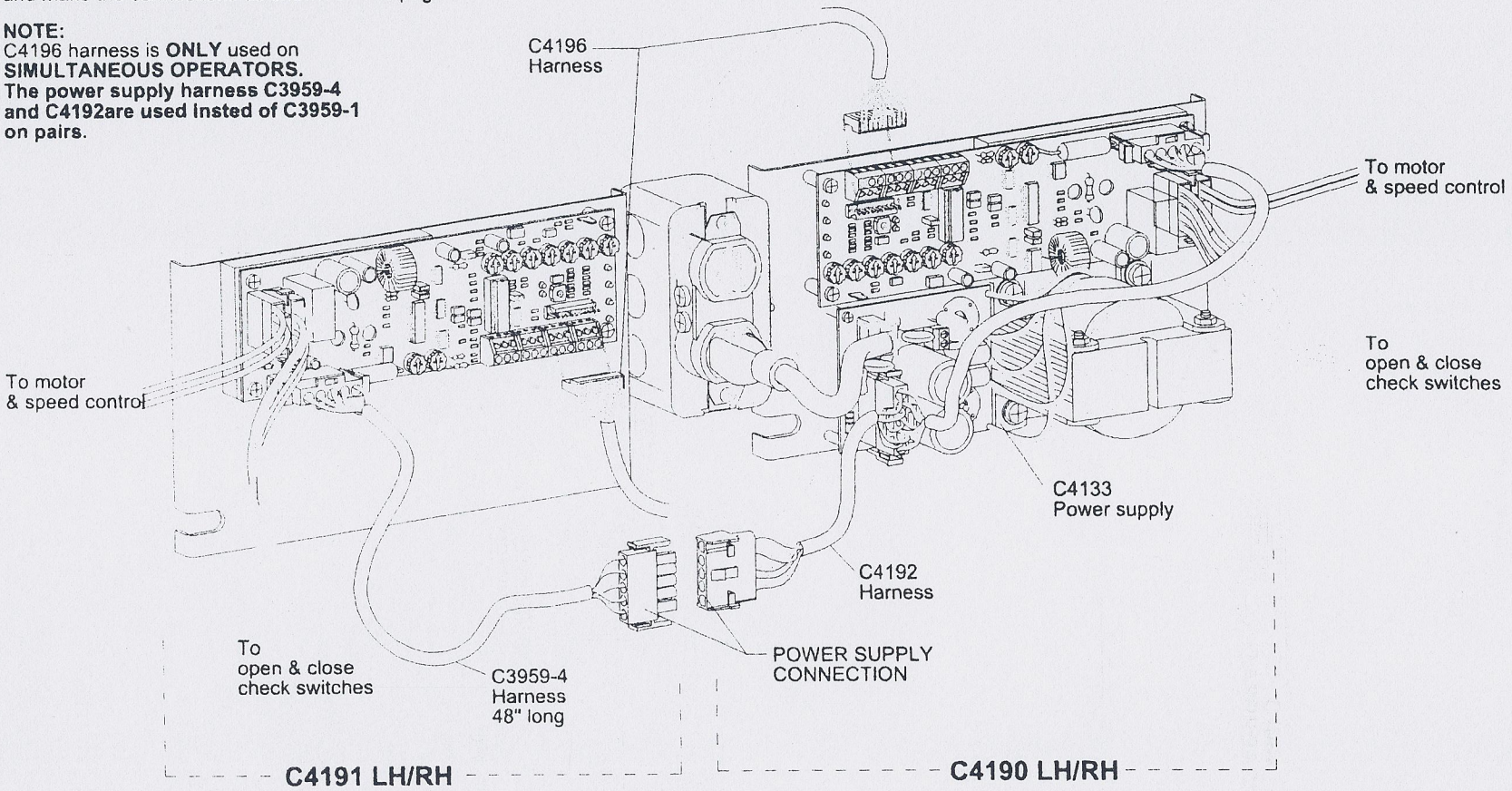
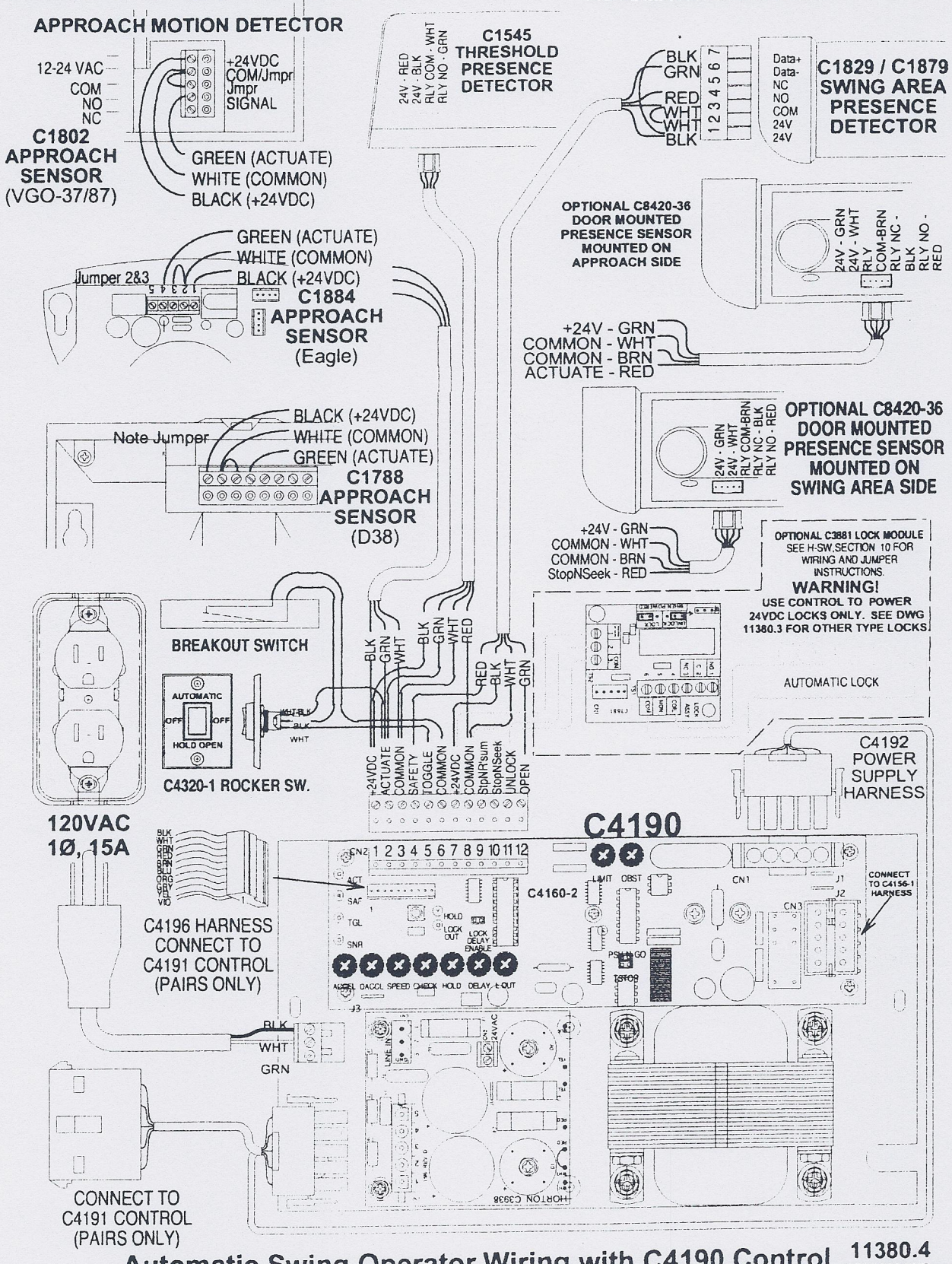


DIAGRAM 1 AUTOMATIC OPERATION

AUTOMATIC OPERATION



Automatic Swing Operator Wiring with C4190 Control

11380.4
27SEP00JWP

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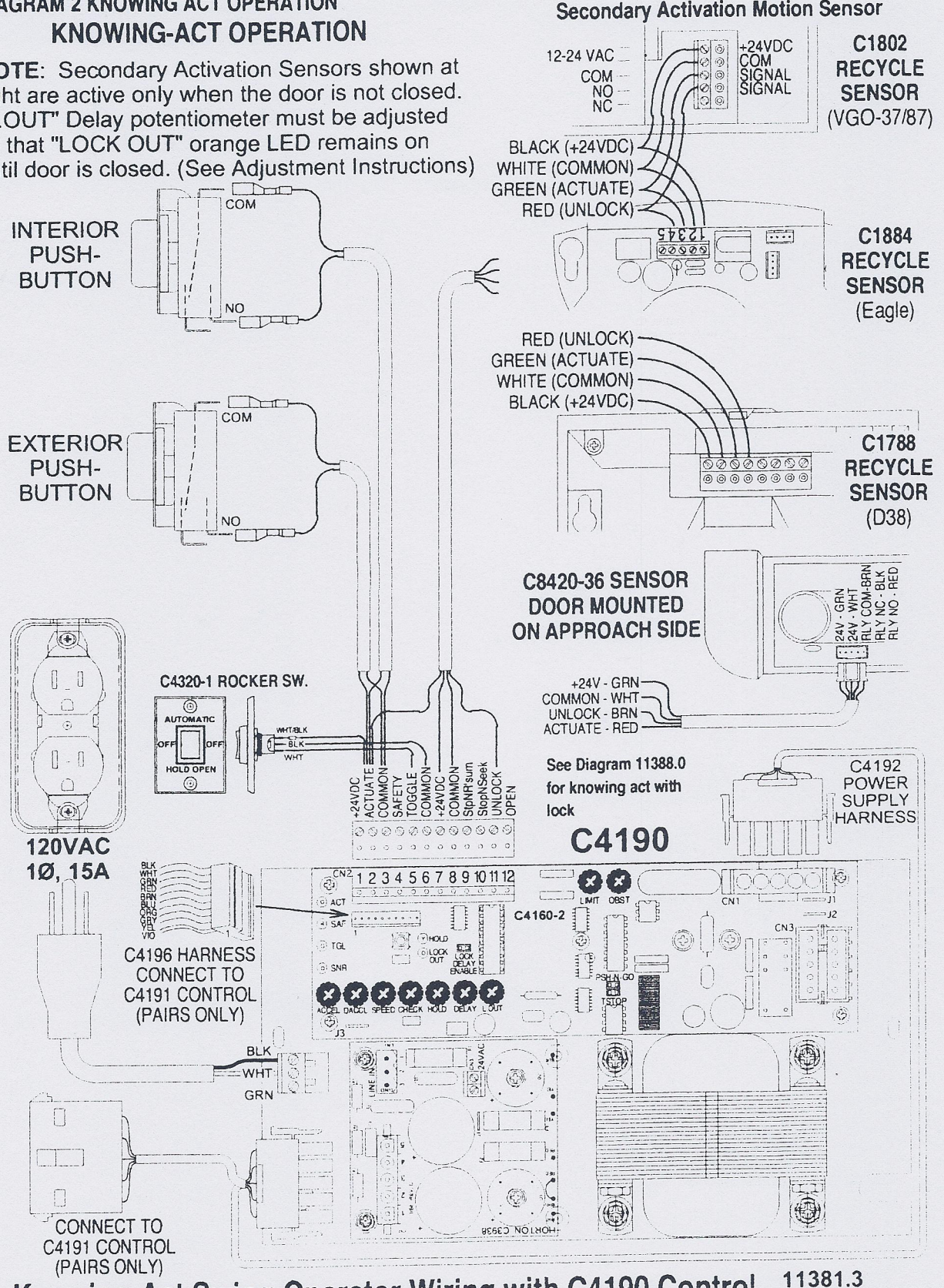
DIAGRAM 2 KNOWING ACT OPERATION

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

11381.3
21MAR00JAL

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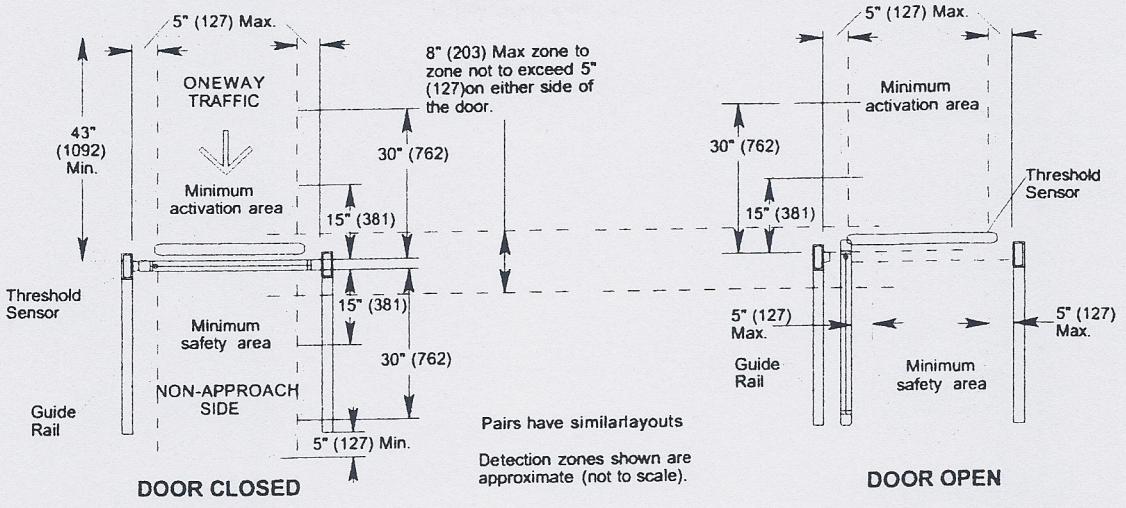
APPENDIX A ACTIVATION AND SAFETY ZONES (swing)

The following general information is provided as a recommendation for safe operation.
See ANSI 156.10-1999 for complete information for swing door activation, safety zones, guide rails and mat layouts. See manufacturers instructions for installation and adjustments of motion and presence detectors.

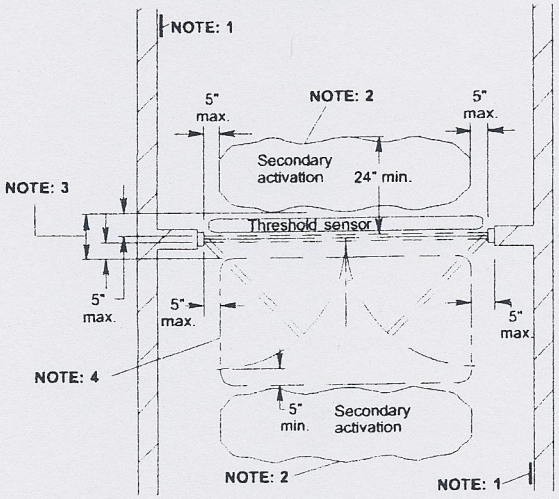
DETECTION AND SAFETY ZONES - HEADER MOUNTED SAFETY SENSORS



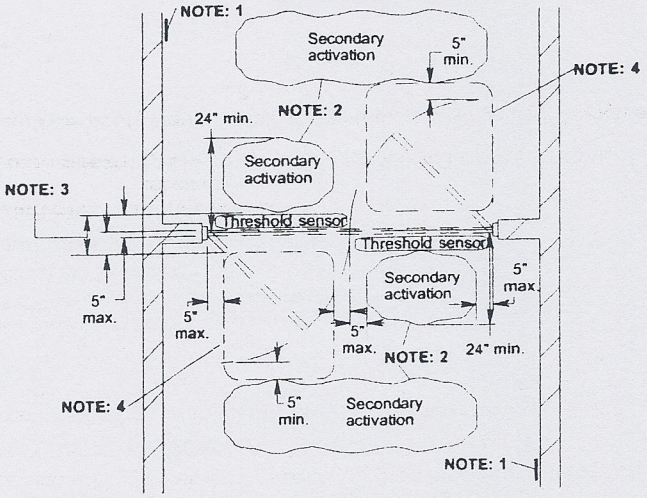
APPENDIX A1 ACTIVATION AND SAFETY ZONES (knowing act)

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

KNOWING ACT 2-WAY TRAFFIC



KNOWING ACT DOUBLE EGRESS



NOTE: 1
Push switch activation. (Knowing act)
- The door shall remain open a min. of 5 sec.after the switch is pushed.
- The switch must be installed within view of the door at a max. distance of 12' from the center of the door mounted a min. of 36" and a max. of 48" from the floor.

NOTE: 2
Secondary activating zone:
- Length: minimum 24" approch.
- Width: maximum of 5" on each side of door leaf.
- The activation zone is turned off when the door is within 6" of being closed and turned on when the knowing act switch is activated.

NOTE: 3
If the distance between the secondary activating zone and the safety zone exceeds 8" an additional threshold presence sensor is required.

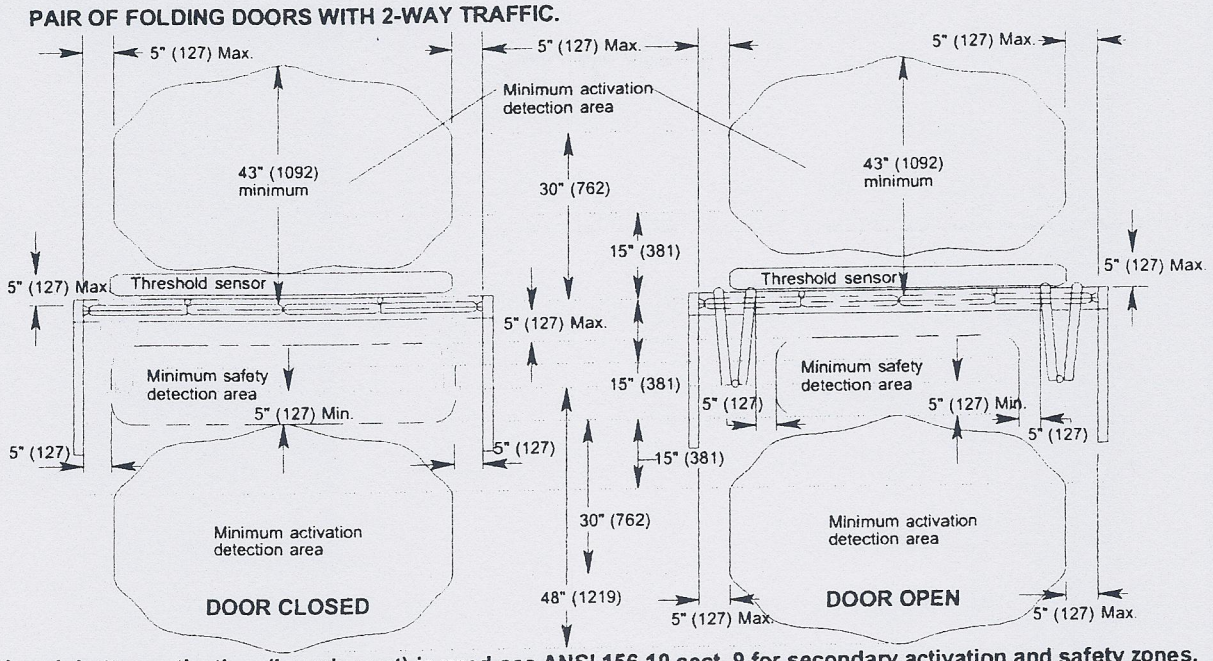
NOTE: 4
Overhead sensor standard safety zone as per ANSI 156.10.

The doors must be simultaneous operated or a guide rail between the doors may be required.

APPENDIX A2 ACTIVATION AND SAFETY ZONES (folding)

The following general information is provided as a recommendation for safe operation. **See ANSI 156.10 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.



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 40 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)

DoorLeaf Width in Inches(mm)	DoorWeightinPounds (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: Adjusttolongertimeto suit traffic conditions and remote mounted activating switch locations

Time Delay (Minimum):
After loss of actuatingsignal shall beas 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.

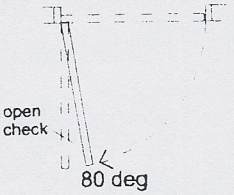
ANSI CHART - OPENING & CLOSING TIME IN SECONDS (LOW ENERGY)

DoorLeaf Width in Inches(mm)	DoorWeightinPounds (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.

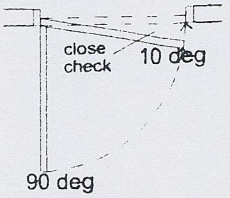
Power Failure: manual pressure not to exceed 15 lb ft (111N) at a point one inch (25mm) from the latch edge (may vary by local code).

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



OPENING TIME:
Doorsshall be field adjusted sothat opening time toopen check or80 deg 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 deg to10 deg in three seconds or longer. Doorsshall close from10 deg to fully closedin 1.5 sec. or more.

4.146d

APPENDIX B. TROUBLESHOOTING

The following items should be checked in the order listed.

Confirm Voltage:

A. Check the power supply at CN1 input for 120VAC.
B. With line voltage present, move to the 5 pin power supply lace and check for voltages between 1 & 2, +120VDC, 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. If OK move on to step C.
C. Reestablish 120VAC and confirm fuse status. Reestablish 5 pin plug and confirm fuse status; if fuse is blown, most likely, control is bad. If the fuse is still good, reestablish motor connection and test operation.

No Voltage at 3 &4, check fuses at the F1 and F3 located on the power supply.

A. Disconnect 120VAC plug, disconnect 5 pin power supply plug, disconnect 2 pin motor plug and remove 12 pin input plug at CN2. Replace fuse.
B. Check low voltage activation circuit for possible shorts in the 24VDC wiring, possible chafing 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 fuse is blown, most likely, control is bad. 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 internally 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.

SEE SECTION 1 OR THE COVER FOR TEST POINT LOCATIONS

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