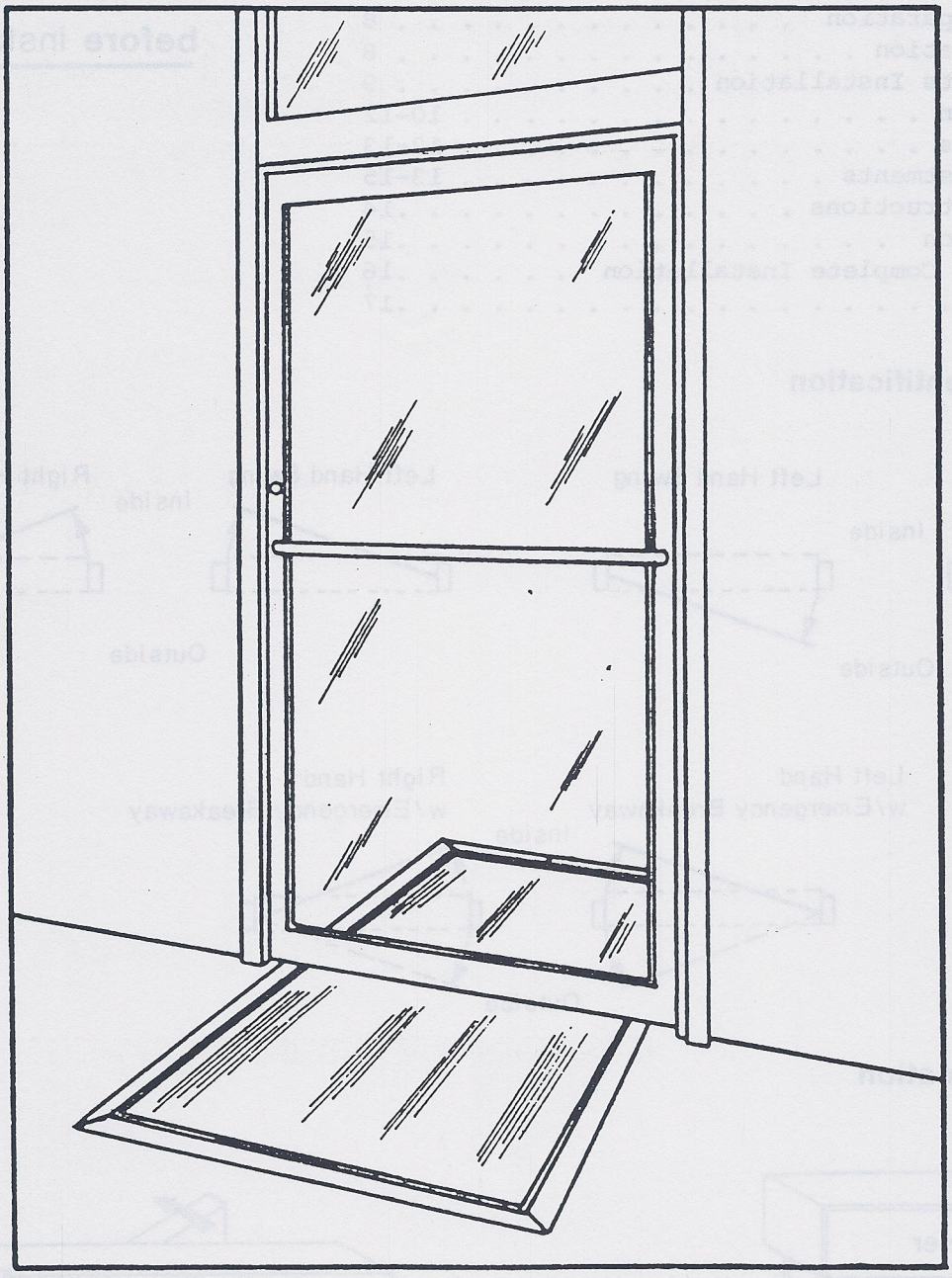
Installation Instructions

Automatic Door Operators

Series 3500 Electromechanical

by Keane Monroe Corporation



Keane Monroe - Opening Doors for People

Keane Monroe Corporation
P.O. Box 5016
Monroe, N.C. 28111-5016
Telephone (704) 289-5581
(800) 438-1937

Index

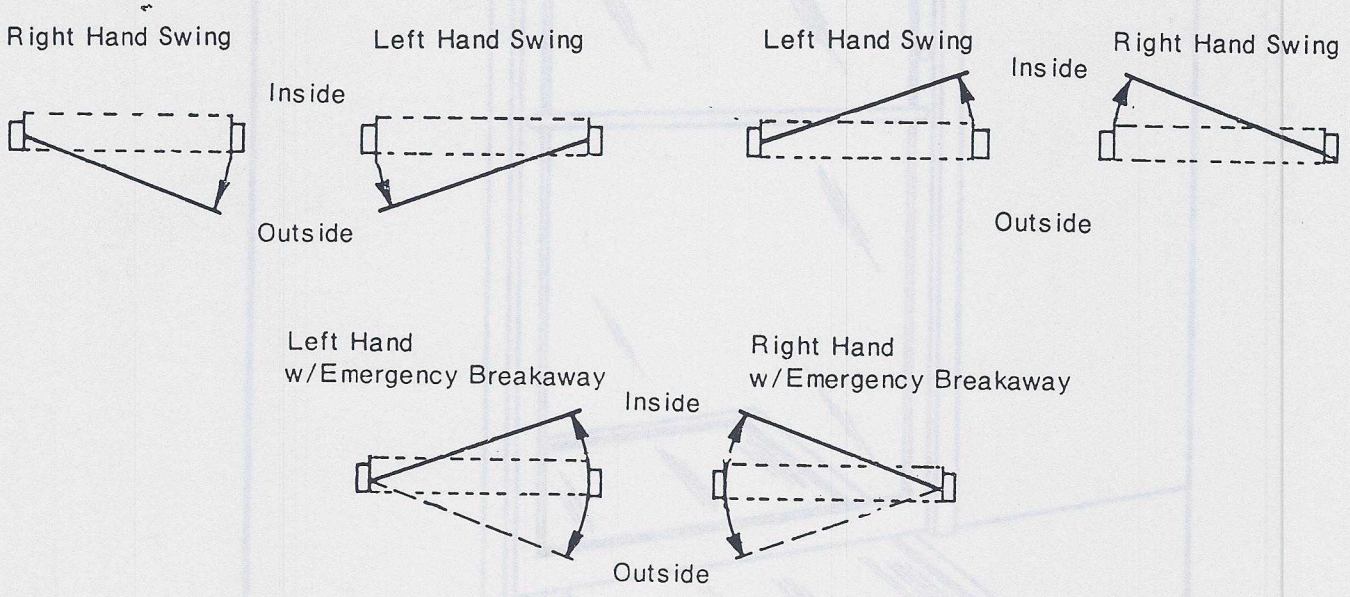
May 15, 1987

Read

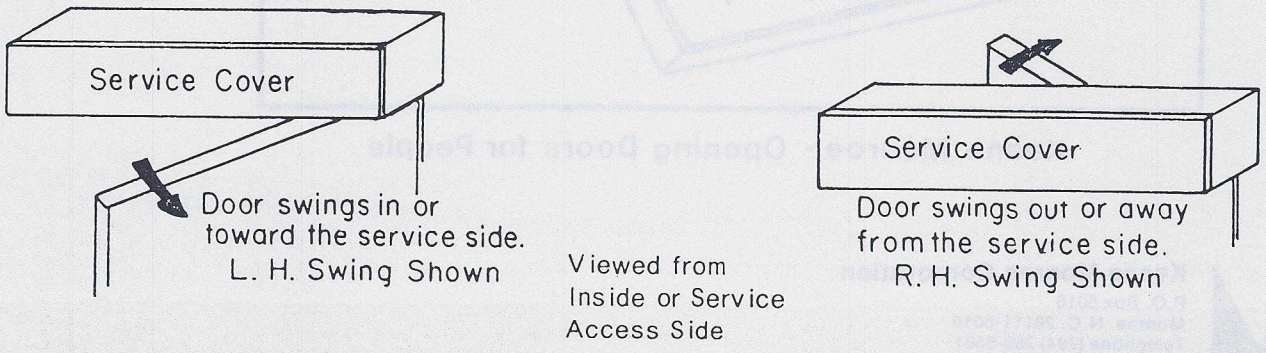
Installation Instructions

before installing.

Hand of Door Identification



Operator Identification



Jamb Preparation

Jamb preparation shown is for header bracket mounting, electrical wiring and mat controls. Other type controls and job conditons may require some variations.

Power, mat wiring, or switching wires are usually run in the latch jamb; however, either may be used. Remove all burrs and sharp edges from wiring holes.

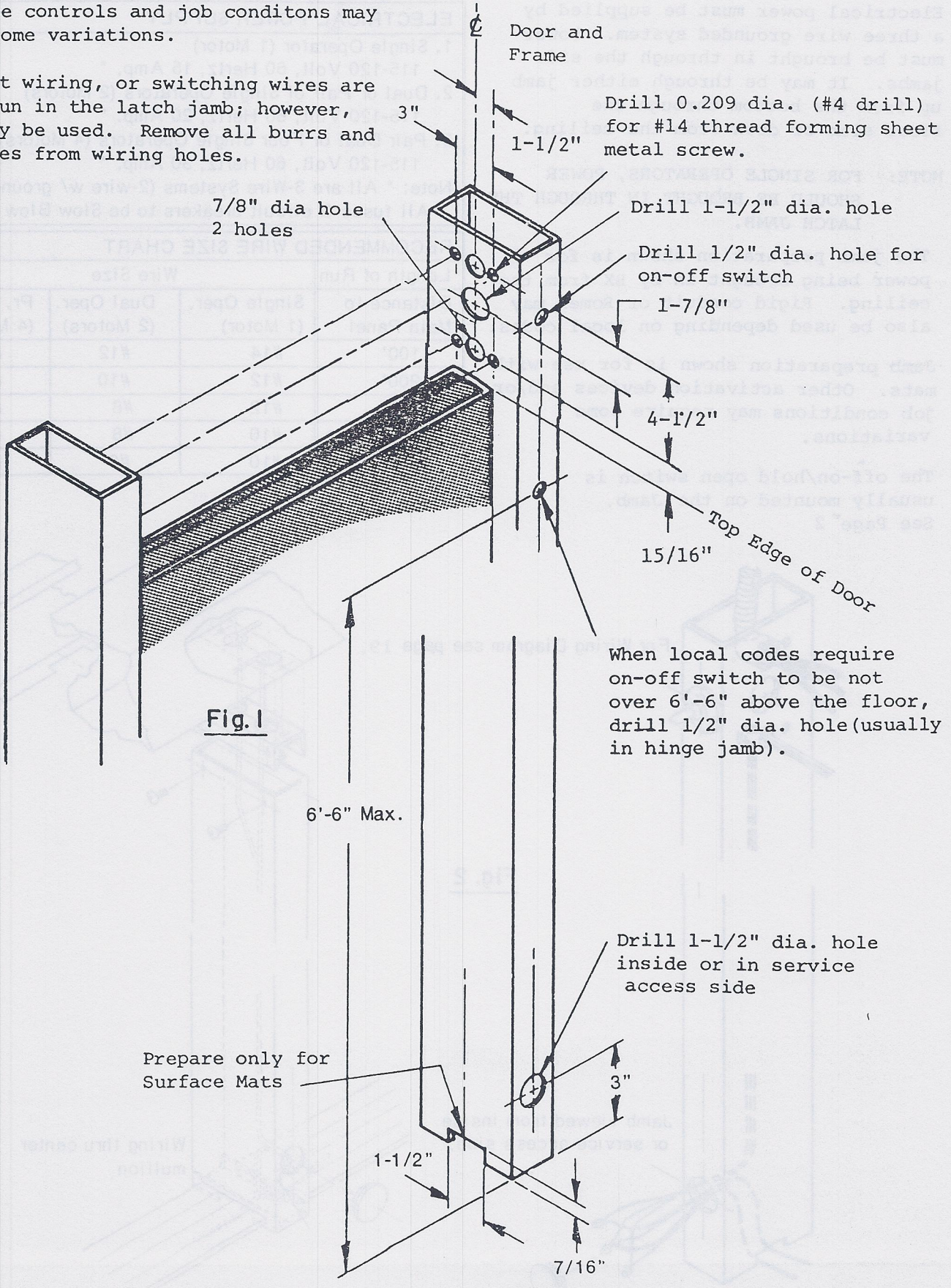


Fig. 1

Electrical Preparation

Preparation of Inside Face of Jamb

Electrical power must be supplied by a three wire grounded system. Power must be brought in through the side jambs. It may be through either jamb up from the bottom through the floor slab or down from the ceiling.

NOTE: FOR SINGLE OPERATORS, POWER SHOULD BE BROUGHT IN THROUGH THE LATCH JAMB.

The jamb preparation shown is for power being brought in by BX from the ceiling. Rigid conduit or Romex may also be used depending on local codes.

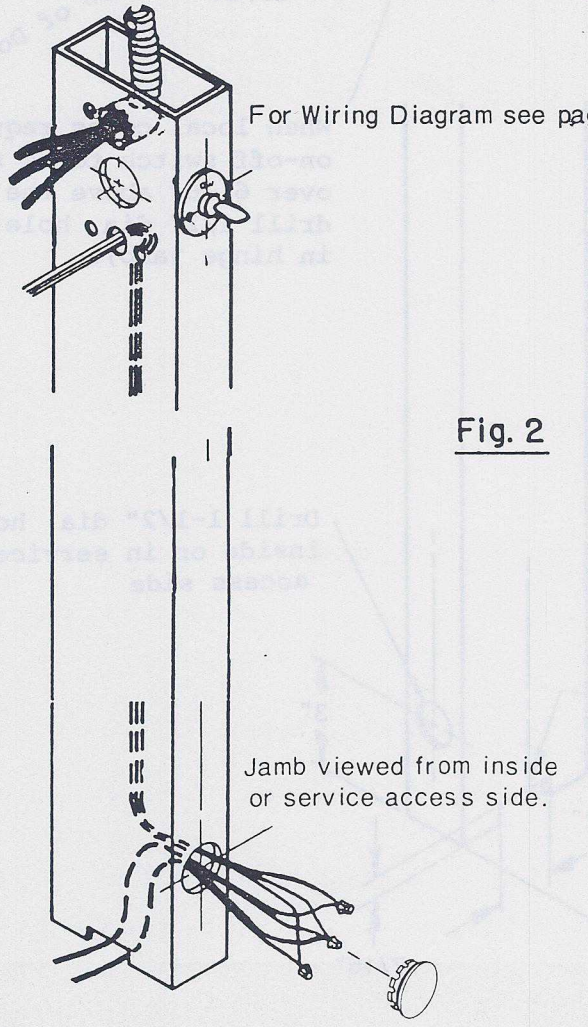
Jamb preparation shown is for use with mats. Other activation devices and/or job conditions may require some variations.

The off-on/hold open switch is usually mounted on the Jamb.
See Page 2

ELECTRICAL POWER SUPPLY
1. Single Operator (1 Motor) 115-120 Volt, 60 Hertz, 15 Amp. * 2. Dual or Pair of Single Operators (2 Motors) 115-120 Volt, 60 Hertz, 20 Amp. * 3. Pair Dual or Four Single Operators (4 Motors) * 115-120 Volt, 60 Hertz, 30 Amp. * Note: * All are 3-Wire Systems (2-wire w/ ground). All fuses & circuit breakers to be Slow Blow Type.

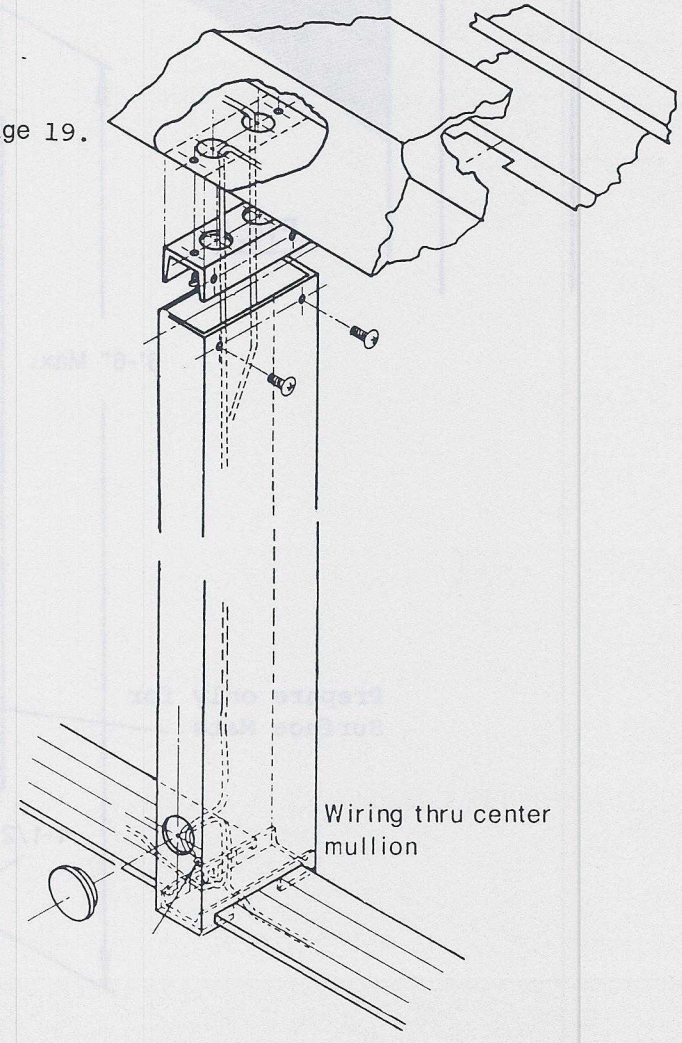
RECOMMENDED WIRE SIZE CHART			
Length of Run	Wire Size		
Distance to Main Panel	Single Oper. (1 Motor)	Dual Oper. (2 Motors)	Pr. Duals (4 Motors)
100'	#14	#12	#10
200'	#12	#10	#8
300'	#12	#8	#6
400'	#10	#8	#6
500'	#10	#6	#4

For Wiring Diagram see page 19.



Jamb viewed from inside or service access side.

Fig. 2



Wiring thru center mullion

Preparation for Mounting Door Arm for Doors with 5/8" or 1" Deep Top Channel.

▶ NOTE: THE TOP DOOR ARM HAS ONE SLOTTED HOLE WHICH IS INTENDED TO BE USED TO INITIALLY HANG THE DOOR. THE COMPLETE HOLE PATTERN IS SHOWN IN FIGURE 3. HOWEVER, THE ONLY HOLE DRILLED IN THE TOP RAIL OF THE DOOR BEFORE THE DOOR IS HUNG SHOULD BE FOR THE SLOTTED HOLE IN THE DOOR ARM.

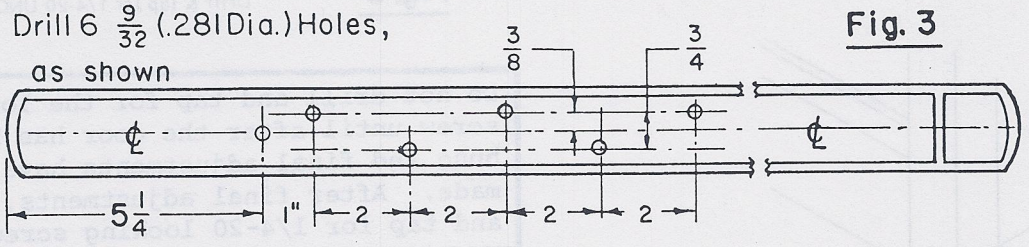


Fig. 3

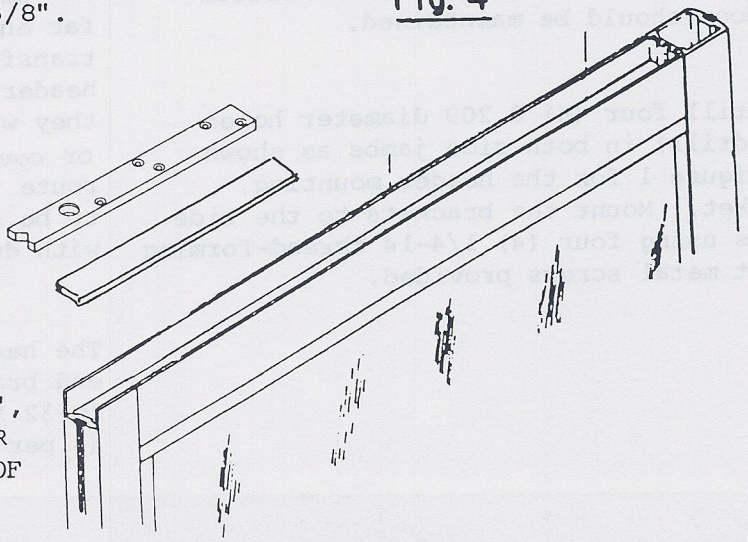
Drill a 0.209 diameter hole (#4 drill) for a 1/4-14 thread forming sheet metal screw, 5-1/4" from the back of the door to the centerline of the hole (this hole corresponds to the slotted hole in the door arm).

Notch the pivot stile of the door at the heel and the top rail down to the rail web depth to allow installation of the back-load top door arm.

Alternate for Channels Deeper than 5/8"

For door channels deeper than 5/8" add filler or shim to make depth of 5/8".

Fig. 4



NOTE: FOR TOP CHANNELS DEEPER THAN 5/8", DO NOT NOTCH THE HEEL OF THE DOOR DEEPER THAN 5/8" (OR TO THE TOP OF THE SHIMS).

Door Preparation

Preparation for Mounting Bottom Pivot

Locate and drill & tap 2 holes for 1/4-20 X 1/2" long phillips round head machine screws as shown above. Cut slot in bottom heel of door, dimension "B" being from bottom of door to bottom of channel. Width, 1-7/17" minimum.

The bottom pivot is adjustable to accommodate bottom rails with channel depths from 7/8" minimum to 1-9/16" maximum.

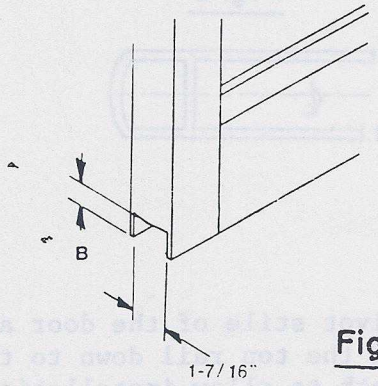


Fig. 6

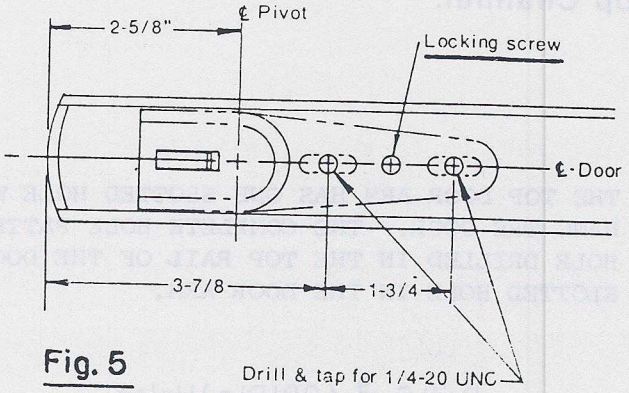


Fig. 5

Do not drill and tap for the locking screw until after the door has been hung and final adjustments have been made. After final adjustments, drill and tap for 1/4-20 locking screw.

Frame and Header Installation

Erect automatic entrance package in entrance opening to door and frame manufacturers instructions. Check frame to be sure it is square and plumb.

An allowance of 1/8" around the door and 3/16" between threshold and bottom of door should be maintained.

Predrill four (4) 0.209 diameter holes (#4 drill) in both side jambs as shown in Figure 1 for the header mounting bracket. Mount the brackets to the side jambs using four (4) 1/4-14 thread-forming sheet metal screws provided.

Before installing the header, be sure the 110V power leads are long enough to reach far enough into the header to connect the transformer. Also, when installing the header, be careful in routing wires so they will not be pinched by the header or cover. On dual units, carefully route the wires around the operator(s) to be sure they will not be interfered with during operation of the unit.

The header may now be slipped over the end brackets and secured in place with 10-32 X 1/2" flat head machine screws (4 per end).

Operator Installation

▶ NOTE: THE OPERATOR IS ALWAYS INSTALLED WITH THE LIMIT SWITCHES ACCESSIBLE FROM THE OPEN (COVER) SIDE OF THE HEADER. WHEN THE DOOR OPENS UNDER THE HEADER, THE SPRING ASSEMBLY WILL BE ON THE SIDE OF THE OPERATOR AWAY FROM THE COVER (SIDE OPPOSITE THE LIMIT SWITCHES). WHEN THE DOOR OPENS UNDER THE COVER, THE SPRING ASSEMBLY WILL BE ON THE SIDE TOWARD THE COVER (SAME SIDE AS THE LIMIT SWITCHES).

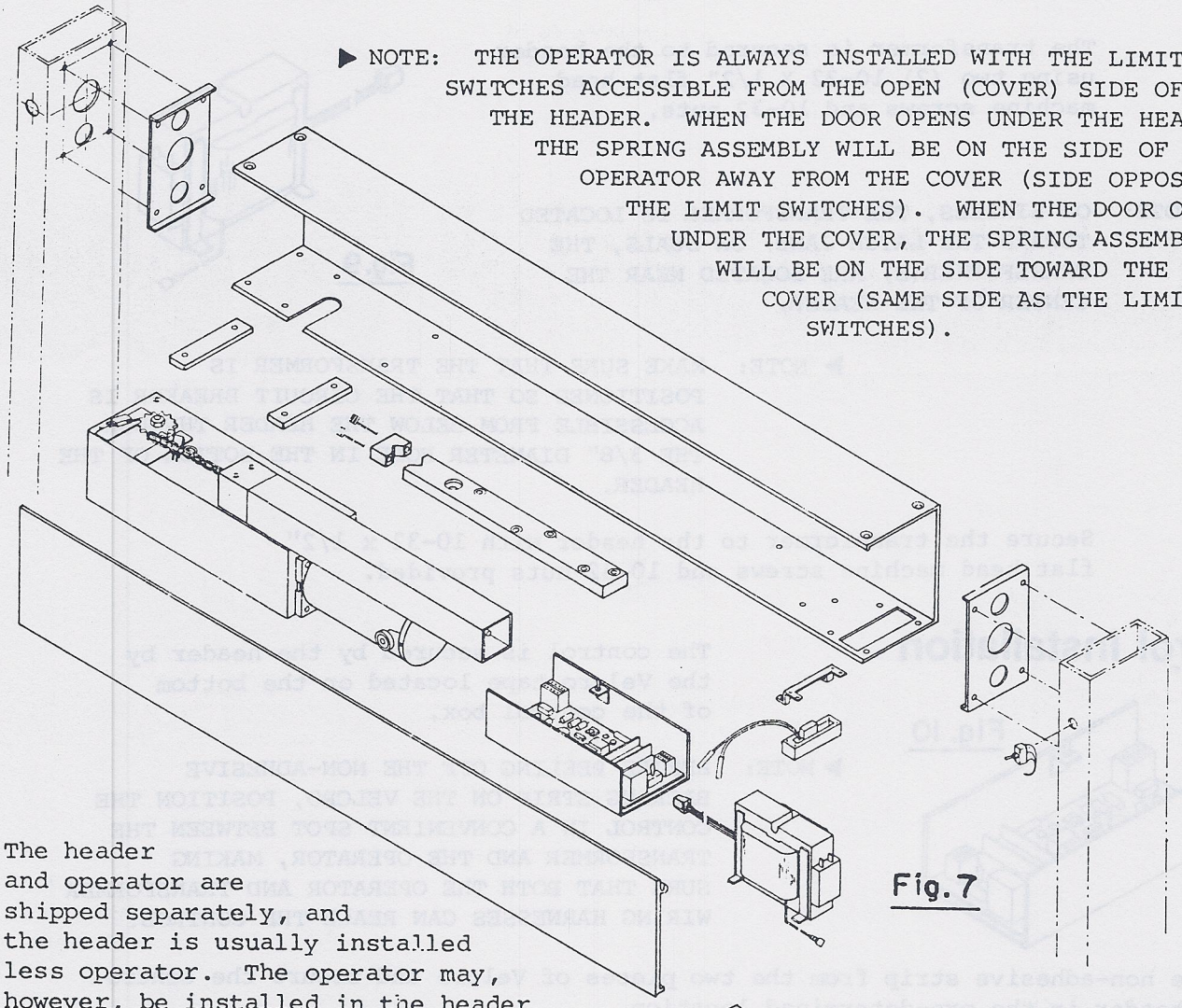


Fig. 7

The header and operator are shipped separately, and the header is usually installed less operator. The operator may, however, be installed in the header before the header is installed in the frame

Place the operator in the header with the output shaft located in the U-shaped cutout in the header, and the four mounting holes in the operator aligned with the four countersunk mounting holes in the bottom of the header.

The operator is secured to the header using four (4) 10-32 X 1 1/4" flat head machine screws. Start each screw into the tapped holes in the operator mounting plates. Once all the screws are started, secure the operator to the header by tightening all four screws.

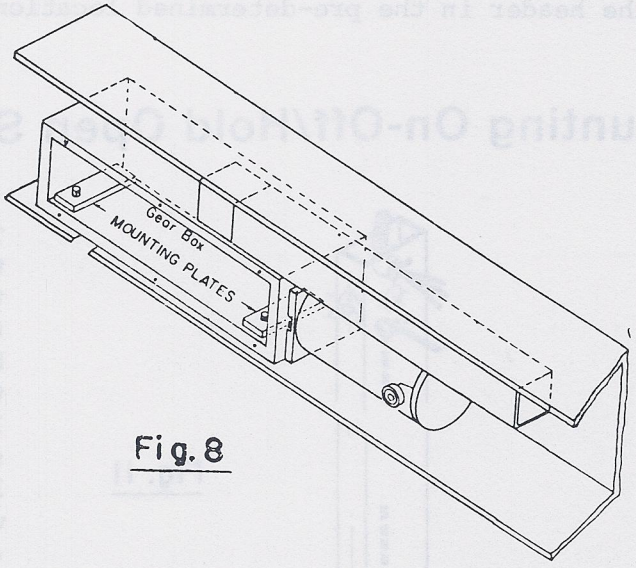


Fig. 8

NOTE: THE OPERATOR IS "CLAMPED" IN THE HEADER USING THE OPERATOR MOUNTING PLATES AS SHOWN IN FIGURE 8.

Transformer Installation

The transformer is secured to the header using two (2) 10-32 X 1/2" flat head machine screws and 10-32 nuts.

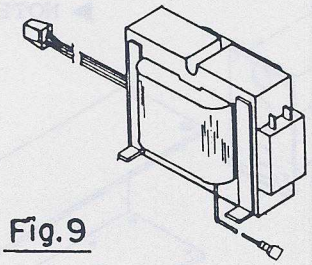


Fig.9

▶ NOTE: ON SINGLES, THE TRANSFORMER IS LOCATED TOWARD THE LATCH JAMB; ON DUALS, THE TRANSFORMER(S) ARE LOCATED NEAR THE CENTER OF THE HEADER.

▶ NOTE: MAKE SURE THAT THE TRANSFORMER IS POSITIONED SO THAT THE CIRCUIT BREAKER IS ACCESSIBLE FROM BELOW THE HEADER THROUGH THE 3/8" DIAMETER HOLE IN THE BOTTOM OF THE HEADER.

Secure the transformer to the header with 10-32 x 1/2" flat head machine screws and 10-32 nuts provided.

Control Installation

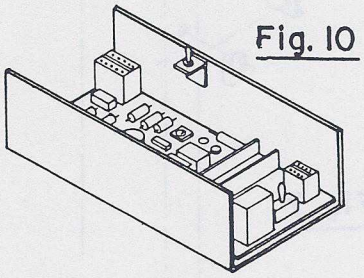


Fig. 10

The control is secured by the header by the Velcro tape located on the bottom of the control box.

▶ NOTE: BEFORE PEELING OFF THE NON-ADHESIVE BACKING STRIP ON THE VELCRO, POSITION THE CONTROL IN A CONVENIENT SPOT BETWEEN THE TRANSFORMER AND THE OPERATOR, MAKING SURE THAT BOTH THE OPERATOR AND TRANSFORMER WIRING HARNESSES CAN REACH THE CONTROL.

Peel the non-adhesive strip from the two pieces of Velcro and secure the control to the header in the pre-determined location.

Mounting On-Off/Hold Open Switch

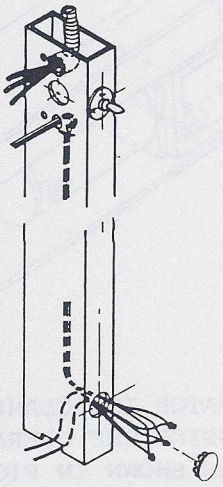


Fig. 11

To mount the off-on hold/open switch in the side jamb, remove this switch from the control. Drop the switch down through the 1 1/2" diameter access hole and fish switch toggle out through the 1/2" diameter hole. Place the tabbed legend washer over the shank of the switch, and secure in place with the lock nut. Using the hole in tabbed washer as a drill guide, drill a number 42 hole in the jamb for the self-tapping screw to lock switch against rotation.

After the switch is mounted, reconnect wires.

Bottom Pivot Preparation

Drop plumb bob from center line of pivot shaft to floor. Mark floor. This is center of pivot for pivot plate. Using pivot plate as a guide, locate and drill all holes into floor. Insert anchor bolts and attach plate to floor.

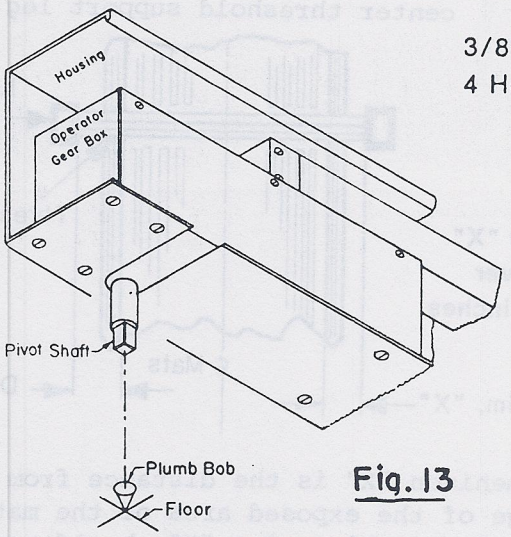


Fig. 13

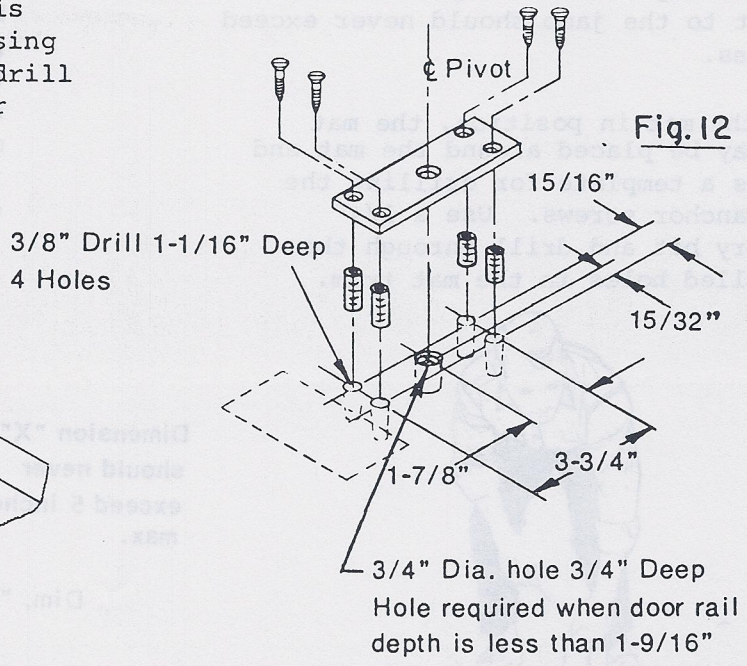


Fig. 12

Threshold Preparation

The threshold furnished in the mat trim kit is 48" long. The center support leg will have been milled off the bottom on one end. Cut off 6 1/2" of this end and prepare this short peice to receive the bottom pivot. It is also recommended that this piece of threshold be further supported on the sides by 2 pieces of threshold lead up.

The balance of the threshold should be cut to length and drilled and counter sunk on center for attachment to the floor for the surface mounted mats.

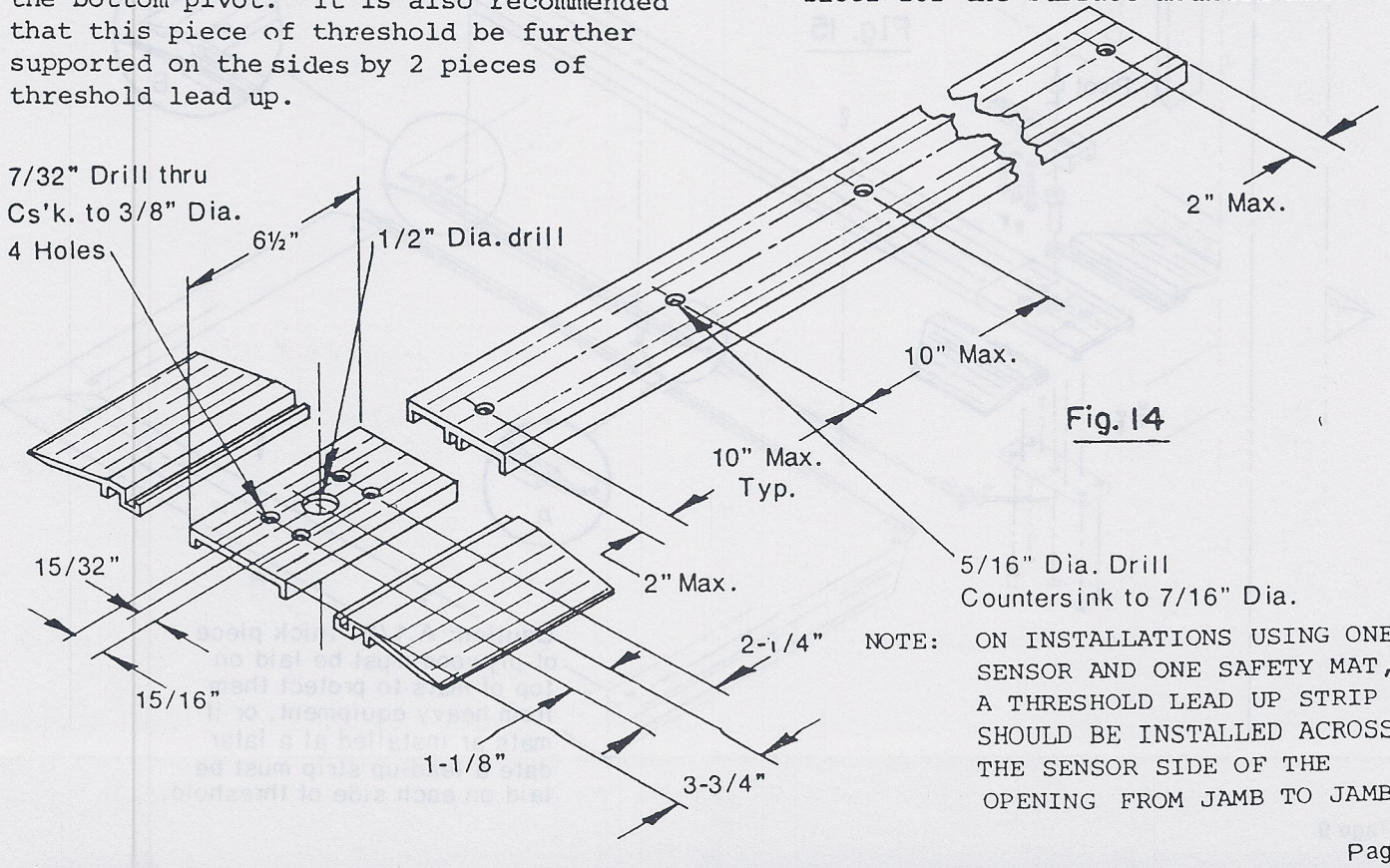


Fig. 14

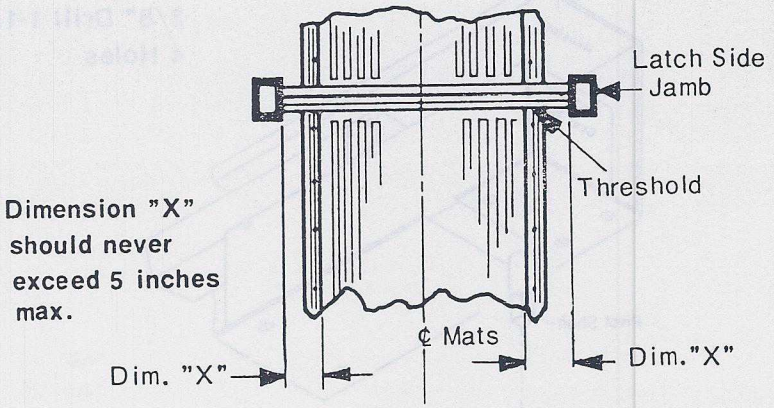
NOTE: ON INSTALLATIONS USING ONE SENSOR AND ONE SAFETY MAT, A THRESHOLD LEAD UP STRIP SHOULD BE INSTALLED ACROSS THE SENSOR SIDE OF THE OPENING FROM JAMB TO JAMB.

Installation of Floor Control Mats

Position mats under threshold and center between jambs. Caution: The distance from the edge of the "exposed" area of the mat to the jamb should never exceed 5 inches.

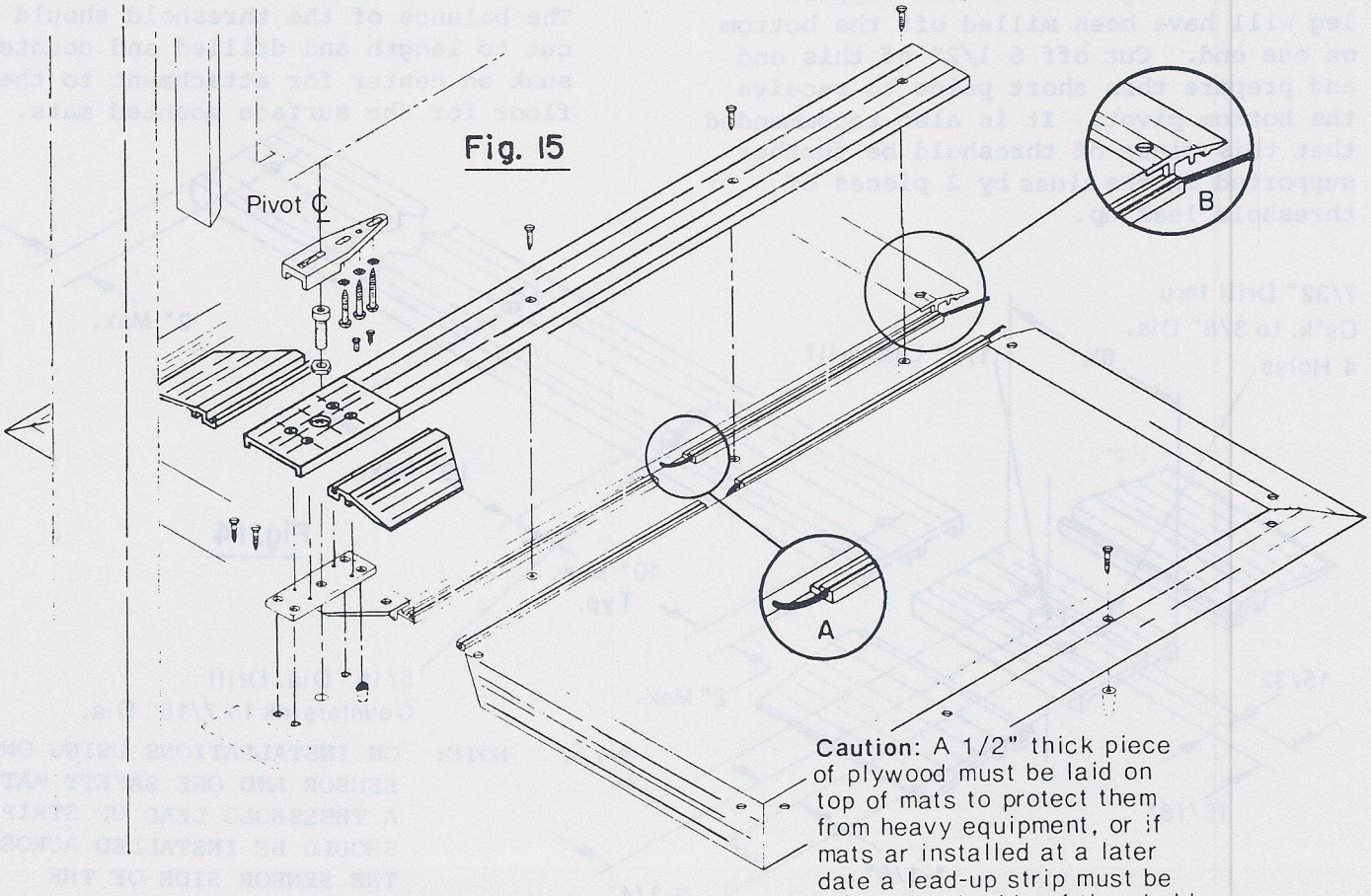
With the mat in position, the mat trim may be placed around the mat and used as a template for drilling the floor anchor screws. Use a 1/4" masonary bit and drill through the predrilled holes in the mat trim.

Caution: Place the mat lead wire into the wire groove on the end of the mats (See Fig. 15, A & B). Move wires out of the way before any drilling is performed Be sure all dirt, dust, shavings, etc. has been removed from under the mat trim and threshold before they are secured in place. Also be sure the mat lead wires are run into the side jamb and will not be caught under the center threshold support leg.



Dimenison "X" is the distance from the edge of the exposed area of the mat to the jamb. Dimension "X" should never exceed 5 inches.

Fig. 15



Caution: A 1/2" thick piece of plywood must be laid on top of mats to protect them from heavy equipment, or if mats ar installed at a later date a lead-up strip must be laid on each side of threshold.

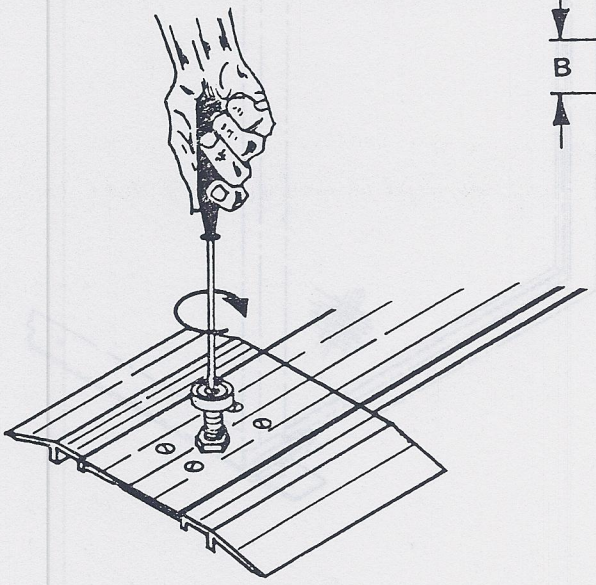
To Set Height of Bottom Pivot

Measure depth of bottom door channel. This will be dimension "B".

Subtract 1/16" from dimension "B". This will be dimension "C". Dimension "C" is the top distance from the top of the pivot to the top of the threshold (or finished floor if no threshold).

Turn Bottom Pivot Shaft up or down as needed to meet "C" dimension. (See Fig.

Lock Bottom Pivot Shaft with 3/4" lock nut.



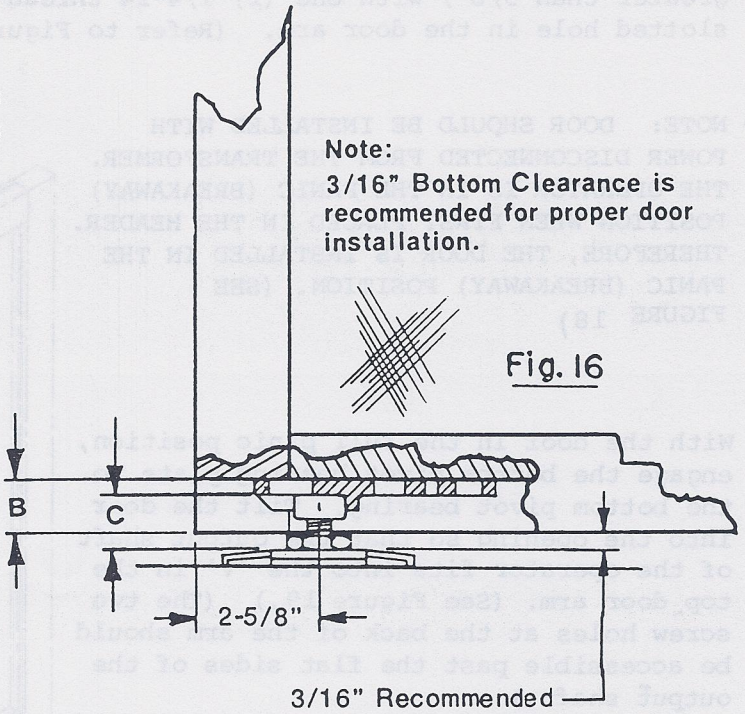


Fig. 16

Mount bottom pivot bearing plate in bottom rail using (2) 1/4-20-1/2" Phillips Round Head screws with lockwashers. Set centerline of bearing socket 2-5/8" from heel of door (See Fig. 5). Tighten screws enough to make final adjustment with door installed in position. Do not drill and tap for locking screw until all final adjustments to the door have been made.

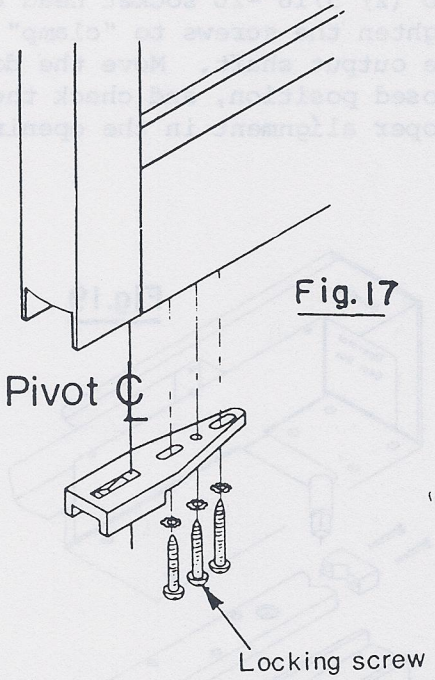


Fig. 17

Door Installation

Attach the door arm to the top rail of the door (using shims if the rail depth is greater than 5/8") with one (1) 1/4-14 thread-forming sheet metal screw through the slotted hole in the door arm. (Refer to Figure 3 for location of the hole in rail.)

▶ NOTE: DOOR SHOULD BE INSTALLED WITH POWER DISCONNECTED FROM THE TRANSFORMER. THE OPERATOR IS IN THE PANIC (BREAKAWAY) POSITION WHEN FIRST PLACED IN THE HEADER. THEREFORE, THE DOOR IS INSTALLED IN THE PANIC (BREAKAWAY) POSITION. (SEE FIGURE 18)

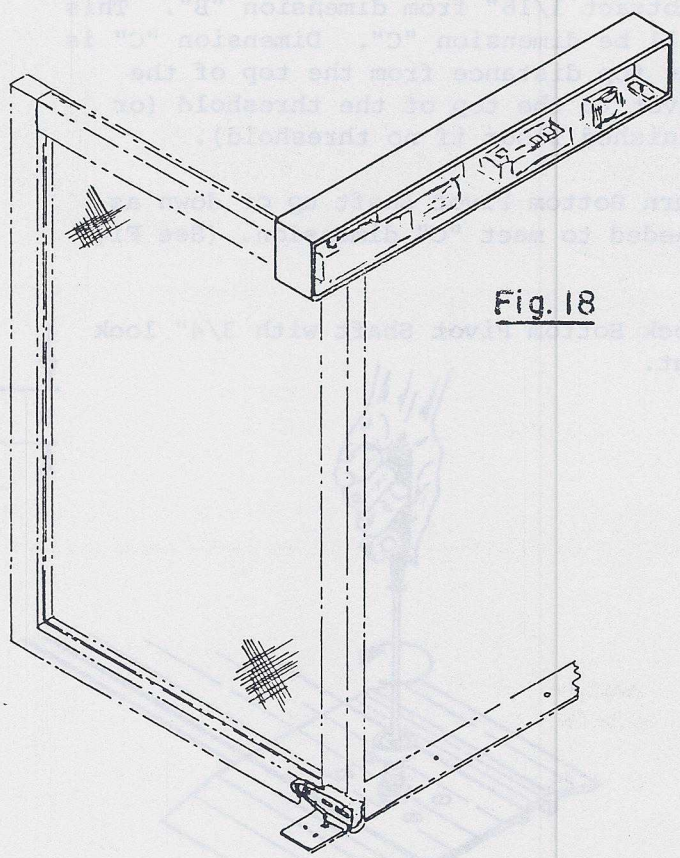


Fig. 18

With the door in the full panic position, engage the bottom pivot bearing plate to the bottom pivot bearing. Tilt the door into the opening so that the output shaft of the operator fits into the 'V' in the top door arm. (See Figure 19.) (The two screw holes at the back of the arm should be accessible past the flat sides of the output shaft.)

Attach the arm hub to the door arm with two (2) 5/16"-20 socket head cap screws. Tighten the screws to "clamp" the arm to the output shaft. Move the door to the closed position, and check the door for proper alignment in the opening.

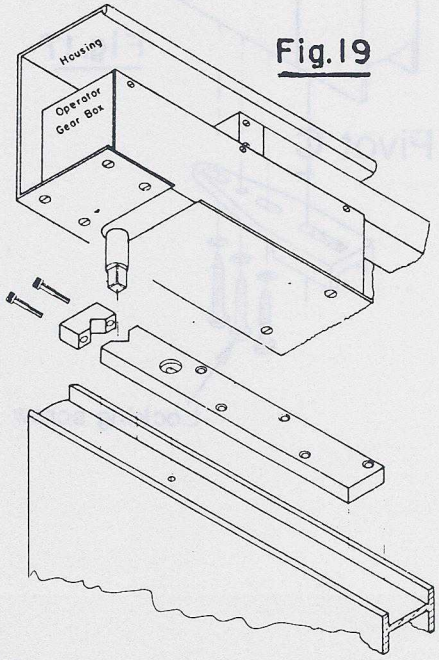


Fig. 19

▶ NOTE: THE SERIES 3500 CAN BE ADJUSTED FOR ALIGNMENT AT THE TOP OF THE DOOR, USING THE SLOTTED HOLE IN THE DOOR ARM, AND AT THE BOTTOM OF THE DOOR, ADJUSTING THE BOTTOM PIVOT BEARING PLATE. THE DOOR MUST BE ALIGNED IN THE OPENING BEFORE BEING OPERATED, MAKING SURE THAT THE CLEARANCE BETWEEN THE BACK OF THE DOOR AND THE SIDE JAMB IS EQUAL FROM TOP TO BOTTOM.

If the alignment must be corrected, adjust the bottom pivot or the door arm as needed.

Once the door is properly aligned in the opening, take the door down and drill the remaining holes for the top door arm and for the bottom pivot locking screw. Check that the door arm is centered in the rail and drill 0.209 diameter (#4 drill) holes in the top rail using the door arm as a template. Drill and tap the bottom rail for the 1/4-20 locking screw, drill a clearance hole in the bottom pivot bearing plate, and attach the locking screw.

Reinstall the door and recheck alignment. If alignment is correct, attach the remaining door arm screws.

Rotate the door to the open position and install the panic switch (for in-swing doors) or the door stop (for out-swing doors) in the header.

Final Connections

Figure 20 shows a completely wired installation using floor mats. Other activation devices will be wired similarly, with the safety device always connected to wires #4 and #5 of the activation wire harness, and the approach device always connected to wires #6 and #5.

▶ NOTE: MAKE SURE THE CIRCUIT BREAKER ON THE TRANSFORMER IS TRIPPED BEFORE MAKING FINAL WIRING HOOK-UPS.

Referring to Figure 20 and to the wiring diagram on the back page, make the following connections in addition to the power hook-up;

1) Connect the two wire connectors from the panic switch to the corresponding two wire connectors in the transformer wiring harness. Plug the ten-pin transformer harness connector (labeled "P") into the "P" socket on the control (the socket is labeled "P" and is located above the opening speed slide switch).

2) Remove the braking resistor from the motor leads.

3) For dual simultaneous units, connect the slave operator motor leads into pins #5 and #7 in the limit switch wiring harness connector labeled "L".

▶ NOTE: FOR RIGHT HAND IN AND OUT SWING, PIN #5 RECEIVES THE BLACK LEAD, #7 RECEIVES THE RED LEAD; FOR LEFT HAND IN AND OUT, PIN #7 IS BLACK AND PIN #5 IS RED.

4) Plug the "L" connector into the socket labeled "L" on the control (the socket is located next to the closing speed rheostat).

5) Plug the activation wire harness (which contains the ON/OFF/HOLD OPEN switch) into the 3-pin socket on the control (the socket is located next to the two power relays).

Start-up and Adjustments

With the door in the closed position, turn the ON/OFF/HOLD OPEN switch to 'ON' and reset the circuit breakers (both the breaker mounted on the transformer and the supply breaker in the electrical panel).

▶ NOTE: ALL ADJUSTMENTS SHOULD BE MADE SO THAT THE OPERATION OF THE UNIT IS WITHIN THE LIMITS OF ANSI STANDARD A156.10. IF YOU HAVE ANY QUESTIONS ON THE STANDARD, PLEASE CALL KEANE MONROE AT 1 800 438-1937.

Referring to the wiring diagram, the following adjustments are available on the control:

OPENING SPEED: The opening speed slide switch can be used to select Low, Medium or High Speed.

BACK CHECK SPEED: The back check toggle switch can be used to select low or high speed.

CLOSING SPEED: The closing speed rheostat can be used to vary the closing speed.

OPEN TIME DELAY: The time delay potentiameter can be used to adjust the time the door stays open from 0 to 30 seconds.

STACK PRESSURE SWITCH: The stack pressure toggle switch can be used to increase the closing torque of the operator in installations where high wind loads or building stack pressure do not allow the door to completely close. With the stack pressure switch on, if the door does not close in 15 seconds, voltage is applied to the motor to "push" the door closed. Voltage will remain applied until the door is reactivated.

▶ NOTE: THE STACK PRESSURE FUNCTION SHOULD ONLY BE SELECTED WHERE IT IS NEEDED TO OVERCOME EXTRAORDINARY CLOSING RESISTANCE. MOST INSTALLATIONS WILL NOT REQUIRE THE FUNCTION TO BE USED AND THE SWITCH SHOULD REMAIN OFF.

▶ NOTE: IF STACK PRESSURE SWITCH IS ON AND THE DOOR IS OBSTRUCTED OR HELD OPEN BETWEEN FULL OPEN AND LATCH CHECK FOR 15 SECONDS AFTER THE OPERATOR BEGINS TO CLOSE, POWER WILL BE APPLIED TO THE MOTOR AND THE DOOR WILL BE FORCED CLOSE WITH NO CHECKING ACTION TO STOP THE DOOR AT THE CLOSED POSITION.

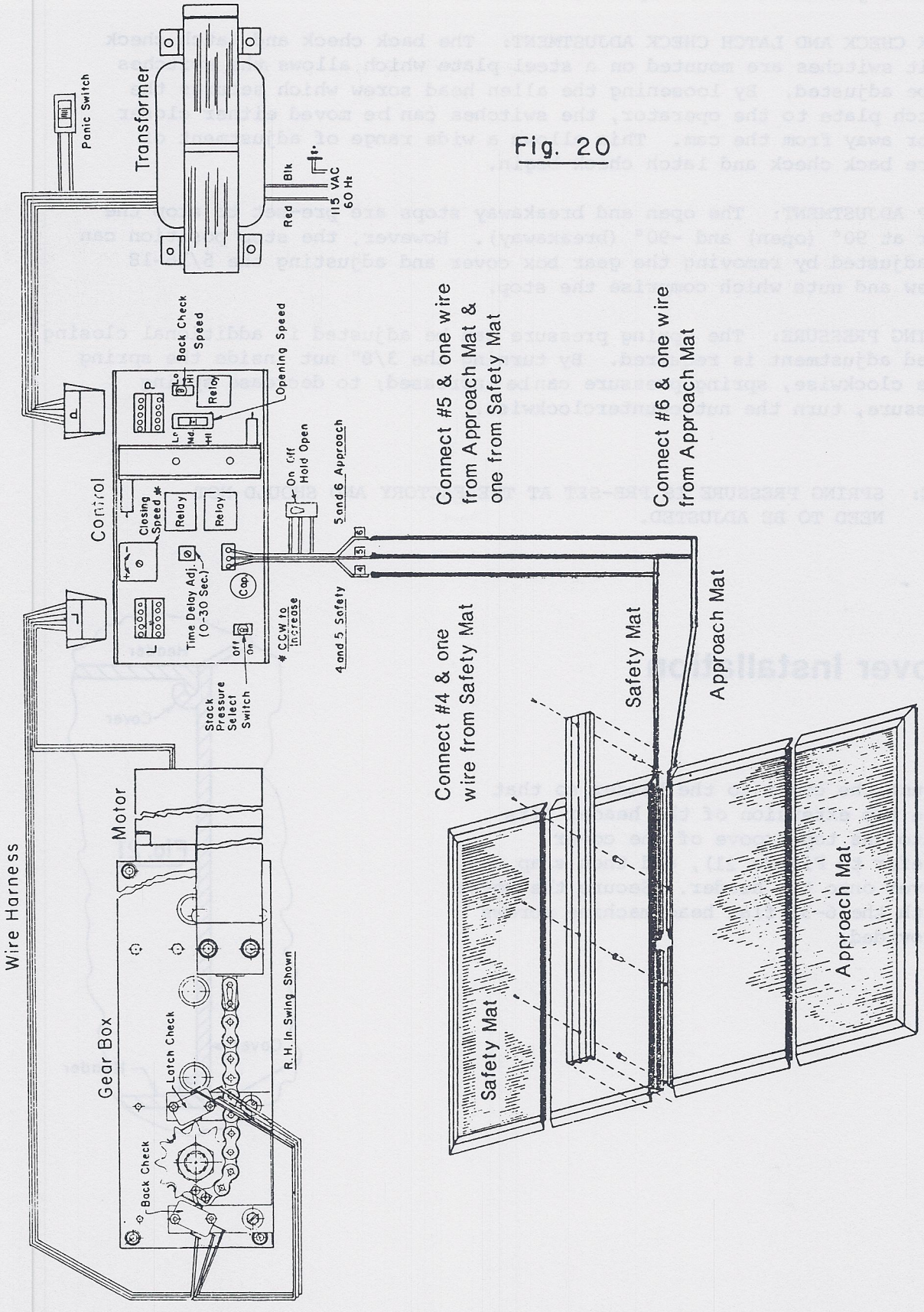

Panic Switch
Transformer
Blk
Red
115 VAC
60 Hz
Back Check Speed
Opening Speed
Lo
Med
Hi
Relay
P
Control
Closing Speed
Relay
Relay
On Off
Hold Open
5 and 6 Approach
Connect #5 & one wire from Approach Mat & one from Safety Mat
Connect #6 & one wire from Approach Mat
Time Delay Adj. (0-30 Sec.)
Cap
CCW to Increase
4 and 5 Safety
off
on
Stack Pressure Select Switch
Connect #4 & one wire from Safety Mat
Safety Mat
Approach Mat
Wire Harness
Motor
Gear Box
Latch Check
Back Check
R.H. In Swing Shown
Safety Mat
Approach Mat

Fig. 20

Other adjustments on the operator include:

BACK CHECK AND LATCH CHECK ADJUSTMENT: The back check and latch check limit switches are mounted on a steel plate which allows the switches to be adjusted. By loosening the allen head screw which secures the switch plate to the operator, the switches can be moved either closer to or away from the cam. This allows a wide range of adjustment of where back check and latch check begin.

STOP ADJUSTMENT: The open and breakaway stops are pre-set to stop the door at 90° (open) and -90° (breakaway). However, the stop position can be adjusted by removing the gear box cover and adjusting the 5/16-18 screw and nuts which comprise the stop.

SPRING PRESSURE: The spring pressure can be adjusted if additional closing speed adjustment is required. By turning the 3/8" nut inside the spring tube clockwise, spring pressure can be increased; to decrease spring pressure, turn the nut counterclockwise.

NOTE: SPRING PRESSURE IS PRE-SET AT THE FACTORY AND SHOULD NOT NEED TO BE ADJUSTED.

Cover Installation

Mount the cover to the header so that the top extension of the header fits into the top groove of the cover (refer to Figure 21), and then snap the cover onto the header. Secure the cover with the 6-32 flat head machine screws provided.

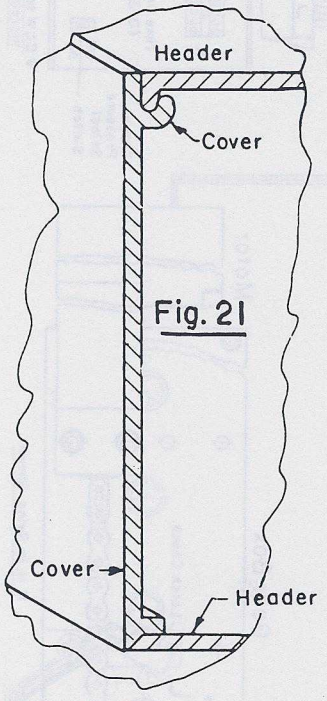


Fig. 21

Exploded View of Complete Installation

Fig. 22

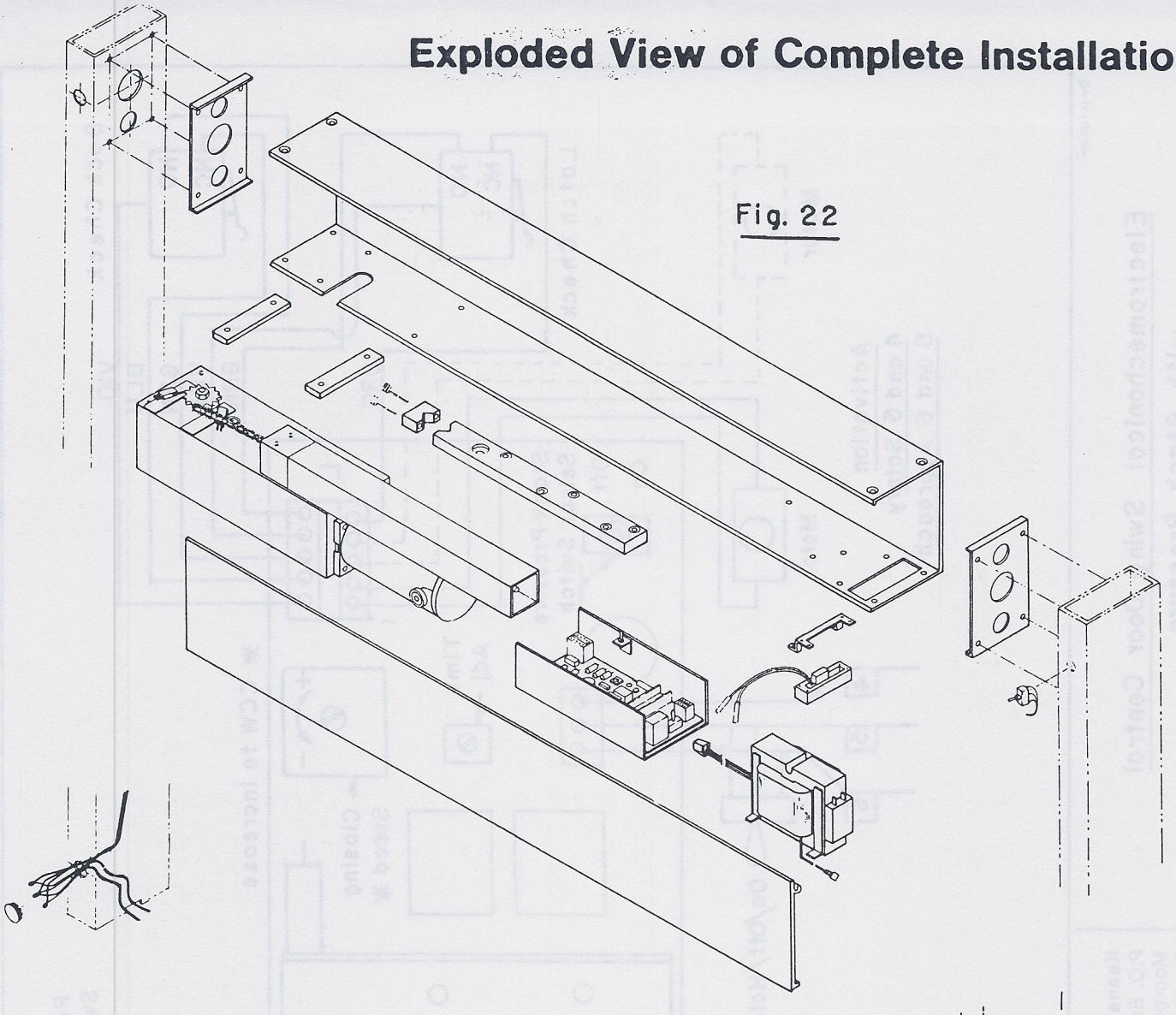
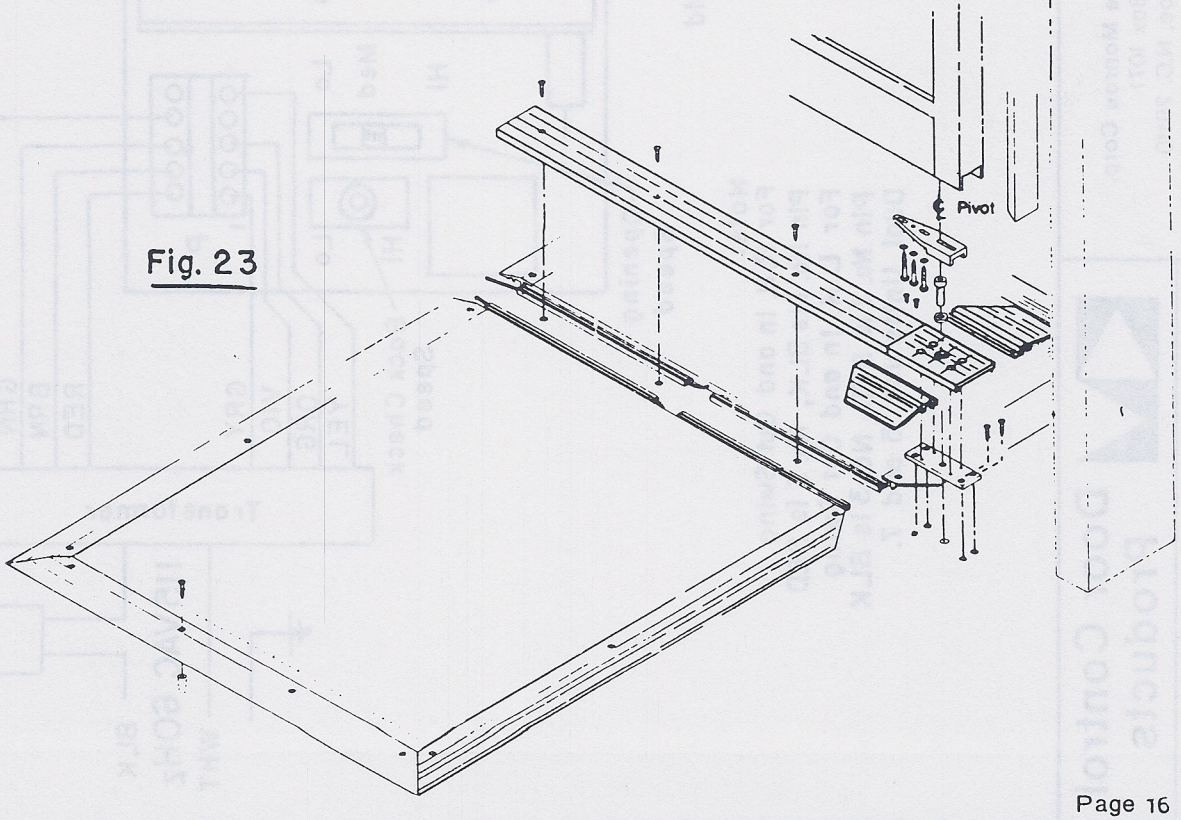
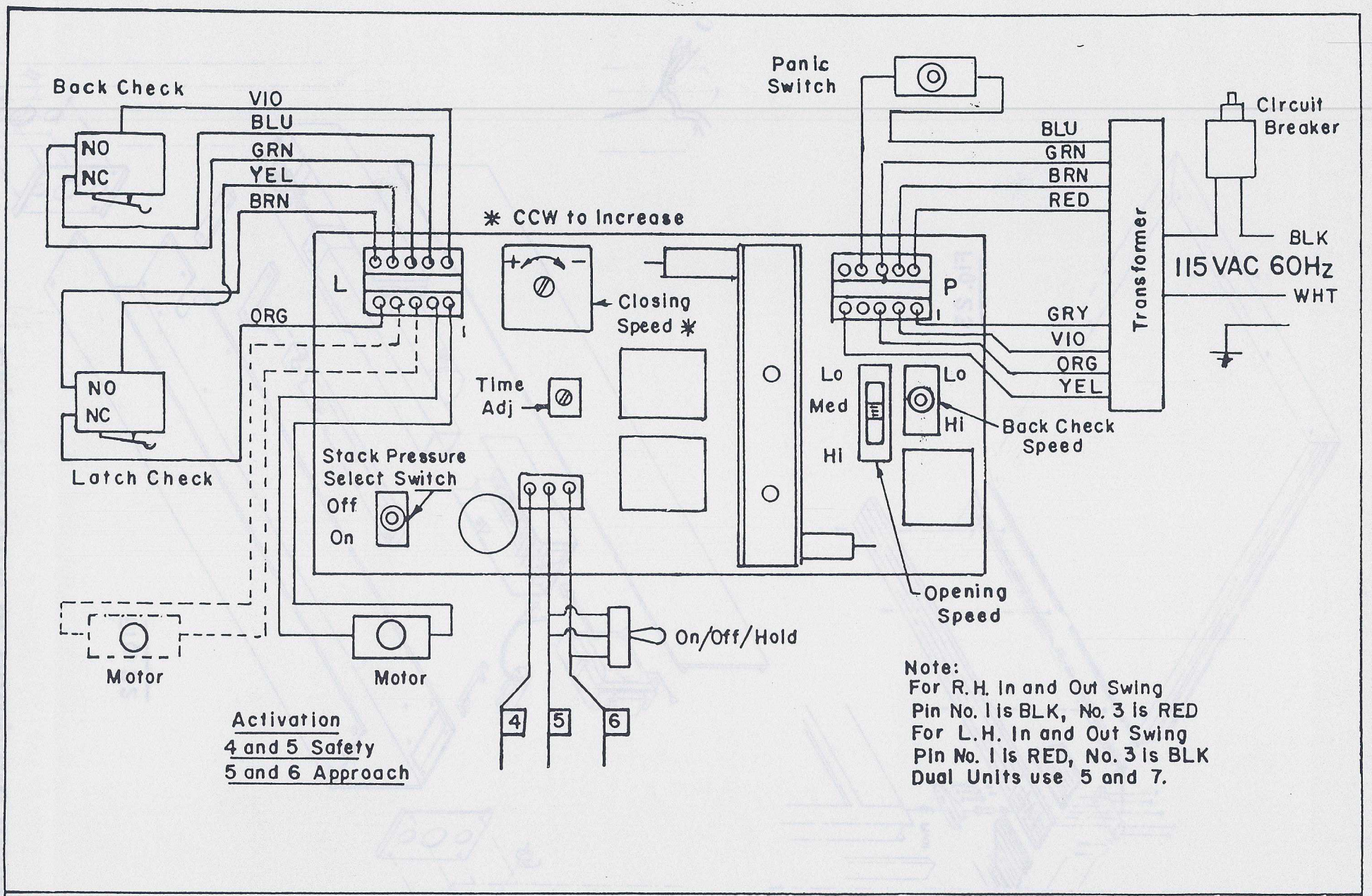


Fig. 23





Description

Electromechanical Swing Door Control with Stack Pressure

Keane Monroe Corp.
P.O. Box 1071
Monroe, N.C. 28110
Telephone (704)289-5581

Door Control Products

Template Drawing No.	Date
WD 3500	3-25-87

KM

AUTOMATED ENTRANCE SYSTEMS

PRODUCT BULLETIN

BY: Mike White

DATE: 11/01/99

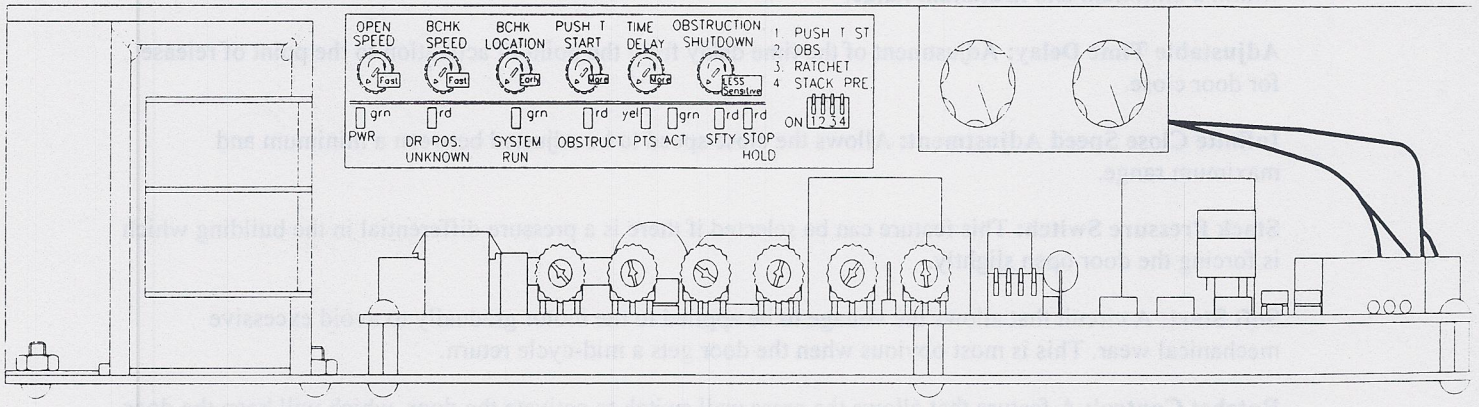
NUMBER: 99-006

NEW ELECTRO-MECHANICAL OPERATOR CONTROL

KM Systems is pleased to announce a new microprocessor control for our Series 3000 electromechanical line of swing door operators. The new control is designated as the "K" control and includes many enhanced features. It will be used on all electromechanical operators except the 3800 Handi-Access Series. The K control has been through thorough product development and rigorous field-test site evaluations. We are providing you with a high quality control that will perform in your most demanding installations.

- ☑ Easily adjustable.
- ☑ Adjustable "Safety Watch" circuit monitors door operation and shuts the motor off if an obstruction is sensed during the opening cycle.
- ☑ Includes "Safety First" recycle feature that reopens the door if an obstruction is sensed at any point during the closing cycle.
- ☑ Hold open time delay from 1 to 30 seconds.
- ☑ Self-diagnostic software.
- ☑ Selectable Push-To-Start and Ratchet functions.
- ☑ Selectable Stack Pressure on full power units.
- ☑ Built in fuse protected accessory power for activation and safety devices.
- ☑ Built in Stop and Hold feature eliminates the need for special modules.
- ☑ Surge and thermal protection built into control and motor circuits.

Orders received after November 1, 1999 will include the new K control. For retrofit applications using current operators previously installed, please contact KM for assistance.



Dual "K" Shown

KM SYSTEMS, INC.

4910 Starcrest Drive (28110) Post Office Box 3099

Monroe NC 28110-3099

(704) 289-9212 / (704) 289-2024 Fax

Control Features for the KM Series 3000 Controls

	"A"	"C"	"U"	"K"
Open Obstruction Shutdown (Adjustable)	•	•		•
Push To Start (Adjustable)	•	•		•
Safety Input	•	•	•	•
Infinite Open Speed Adjustment	•	•		•
Infinite Backcheck Speed Adjustment	•	•		•
Adjustable Time Delay Up to 120 sec.	•	•		
Adjustable Time Delay Up to 30 sec.			•	•
Infinite Close Speed Adjustment	•	•		•
Stack Pressure Switch (Full Power)			•	•
Soft Start				•
Ratchet Control Function (Selectable)	•	•		•
Accessory Power Supply	•	•		•
Stop and Hold Input				•
Microprocessor Based				•
Reopen on Obstruction				•

Definition of Terms:

Open Obstruction Shutdown: In the event that an object or person is in the path of the door as it is going open, the control will automatically shut down the operator and permit the door to spring close. (The force to shut the door down is adjustable.)

Push To Start: If the door is manually pushed towards the open position, the control detects the change in the motor and initiates an activation that automates the door open as if the normal activation device was triggered. (This feature has adjustable sensitivity to detect the amount of door movement.)

Safety Input: Accepts input signals from swing side safety devices to either keep the door closed or, keep the door from closing on a person standing in the safety zone.

Infinite Open Speed Adjustment: Allows the open speed to be adjusted infinitely between a minimum and maximum range.

Infinite Backcheck Speed adjustment: Allows the speed of the last 10° of door travel open to be adjusted within a minimum and maximum range.

Adjustable Time Delay: Adjustment of the time delay from the point of activation to the point of release for door close.

Infinite Close Speed Adjustment: Allows the close speed to be adjusted between a minimum and maximum range.

Stack Pressure Switch: This feature can be selected if there is a pressure differential in the building which is forcing the door open slightly.

Soft Start: A circuit that allows the voltage to be applied to the motor gradually to avoid excessive mechanical wear. This is most obvious when the door gets a mid-cycle return.

Ratchet Control: A feature that allows the press wall switch to activate the door, which will keep the door open until the press wall switch is activated again.

Accessory Power Supply: A built in power supply that powers devices used for activation and safety.

Stop and Hold input: If initiated, this feature stops the door at whatever degree of opening it may be in at the moment the signal is applied. The door remains in this position until the signal is removed. The door goes open slowly to full open then shuts.

Reopen on Obstruction: If during the closing cycle the door is stalled for some reason the control automatically reopens the door to the open position for the set time delay.