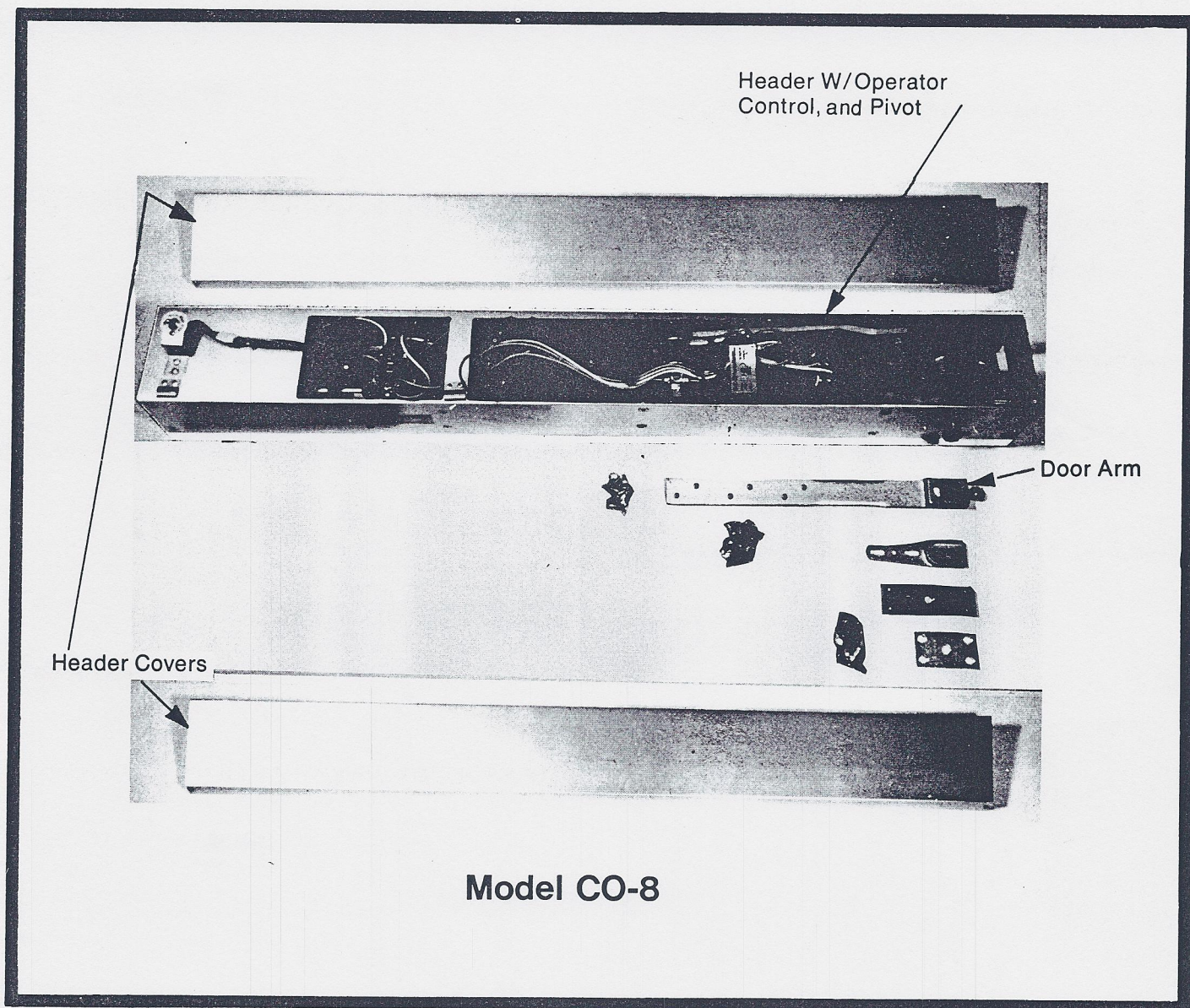


Installation Instructions



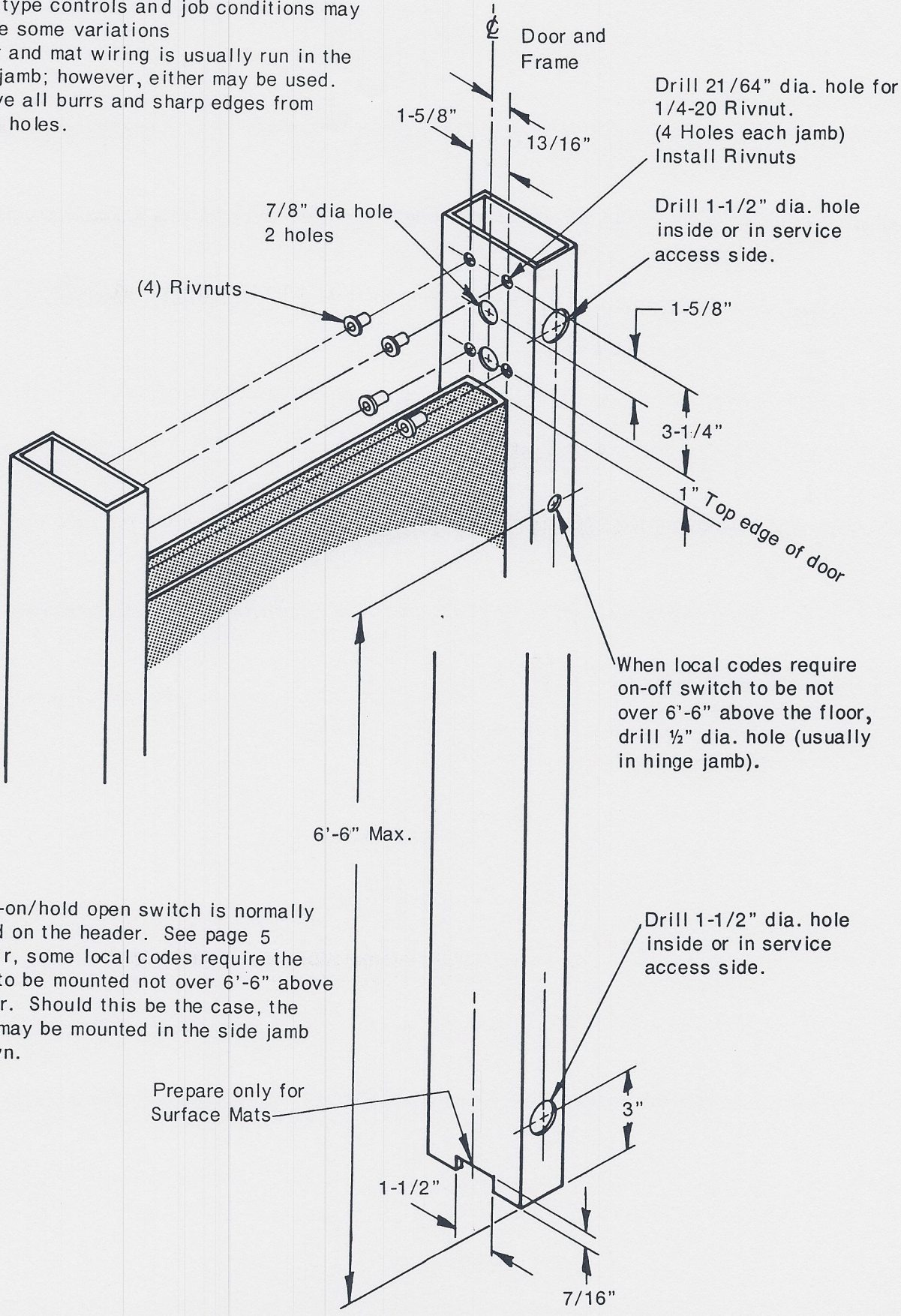
Automatic Door Operators 4000 Series (Model CO-8)



Keane Monroe Corporation
P.O. Box 1071
Monroe, North Carolina 28110

Jamb Preparation

Jamb preparation shown is for header bracket mounting, electrical wiring and mat controls. Other type controls and job conditions may require some variations. Power and mat wiring is usually run in the latch jamb; however, either may be used. Remove all burrs and sharp edges from wiring holes.



The off-on/hold open switch is normally mounted on the header. See page 5. However, some local codes require the switch to be mounted not over 6'-6" above the floor. Should this be the case, the switch may be mounted in the side jamb as shown.

Electrical Preparation

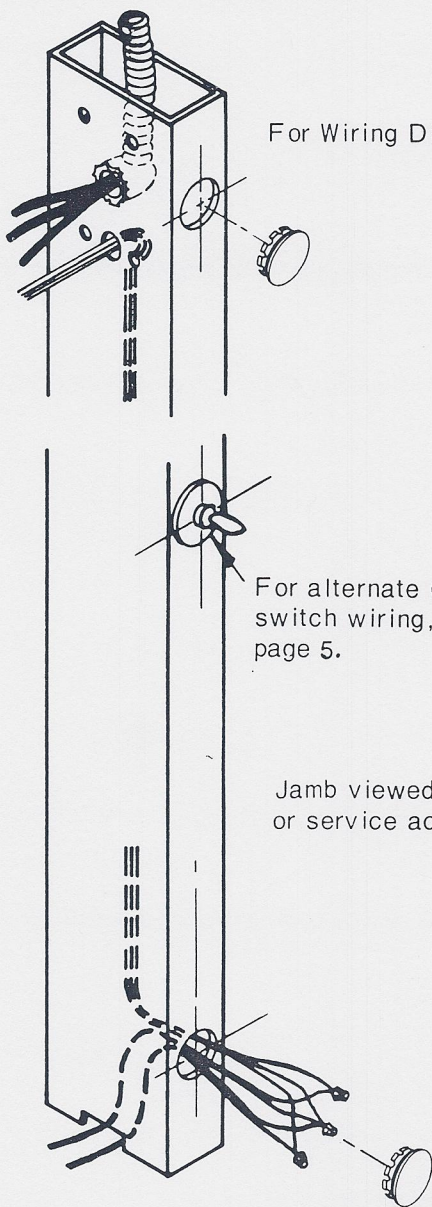
Preparation of Inside Face of Jamb

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 and up from the bottom through the floor slab or down from the ceiling.

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 also is for mat control. Other controls and/or job conditions may require some variations.

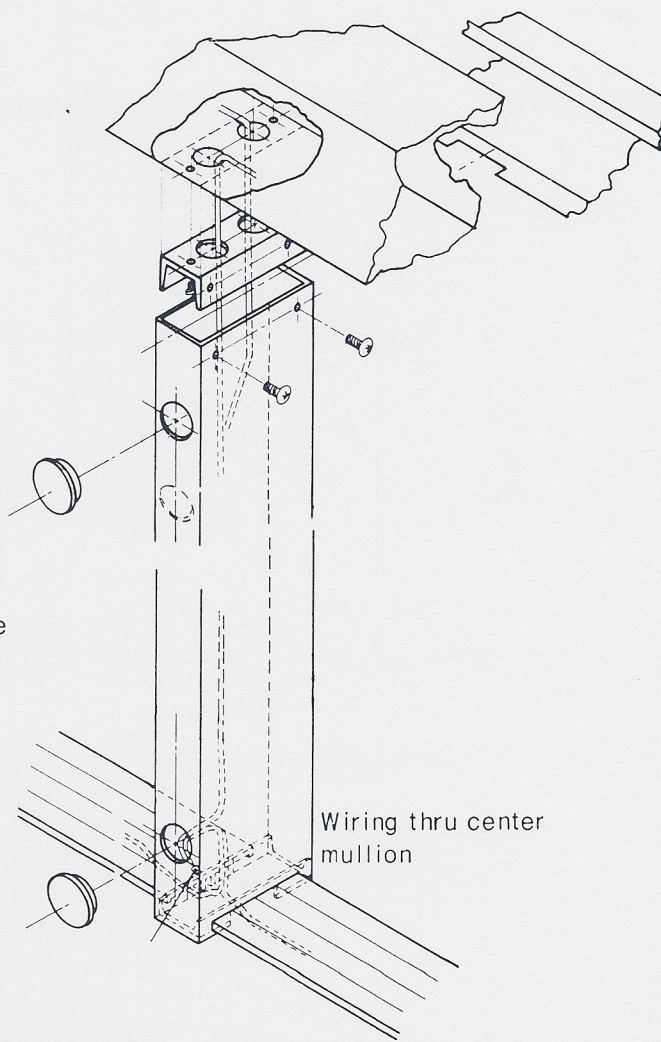
The off-on/hold open switch is usually mounted on the header. See Page 5.



For Wiring Diagram see page 21.

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



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.

Operator Installation

Mount the end brackets to the side jambs using the "rivnuts" and 1/4-20x3/4" Hex Head Machine screws furnished. (4 per bracket)

Before installing the header, be sure the power leads are long enough to reach the control for hook-up. Also, while installing the header, be careful in routing the wires around the operator

to be sure they will not be interfered with during the operation of the unit, or will not be pinched when the header is bolted in place.

The header may now be slipped over the end brackets and secured in place with 1/4-20x3/4" Flat Head Machine Screws (4 per end).

Mounting Operator

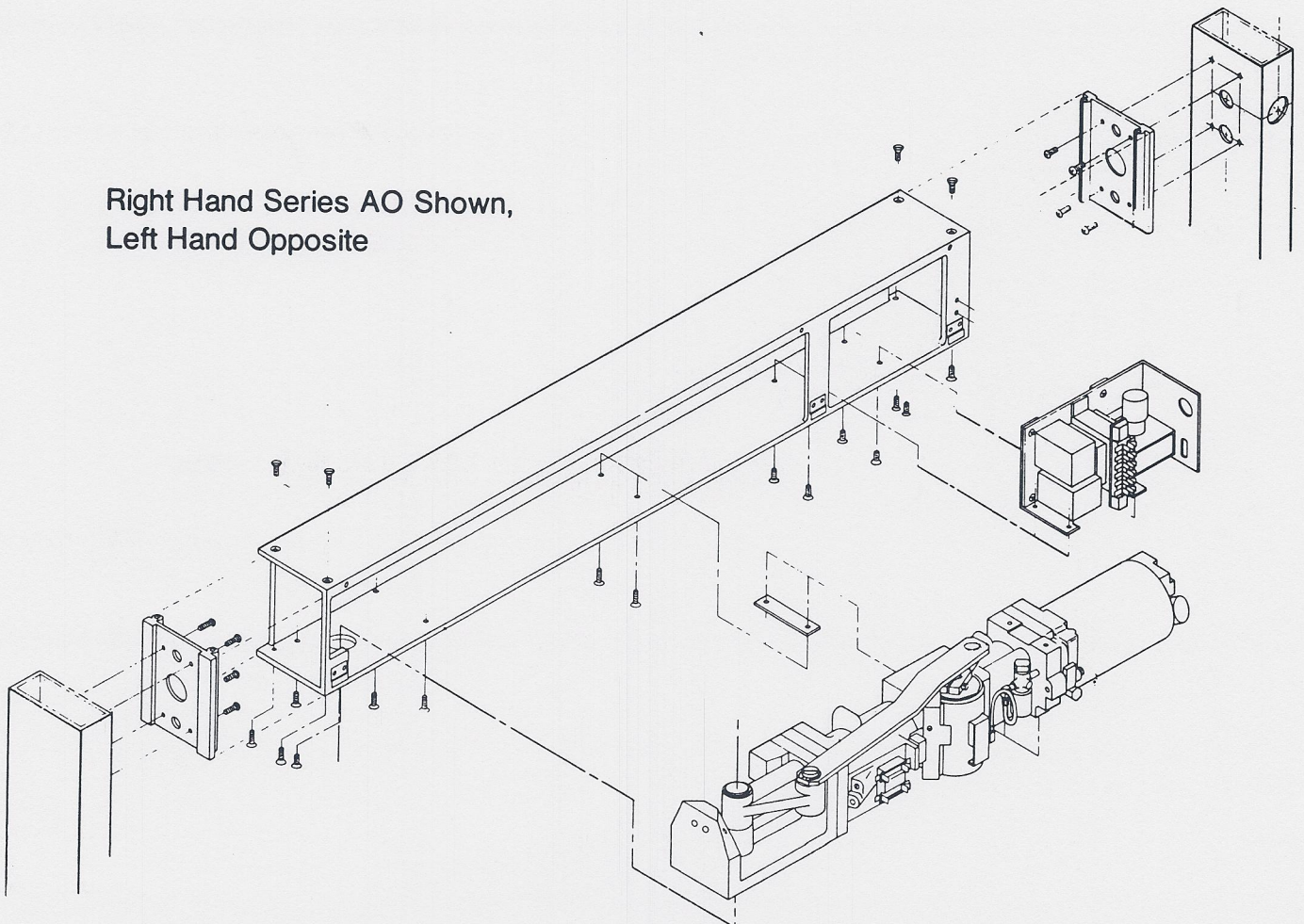
If the operator is not already installed in the header tube, it is sometimes easier to mount the operator before the header is installed in the frame.

The operator may be installed in the header as one piece. By holding the operator at an angle, and inserting the pivot end first, the pivot shaft can be

inserted through the hole in the bottom of the header. Rotate the operator and slip into place. Be sure 1/32" shim plate is installed under the motor pump mounting bosses.

The operator assembly is held in place with (6) 1/4-28x3/8" Flat Socket Head Machine Screw.

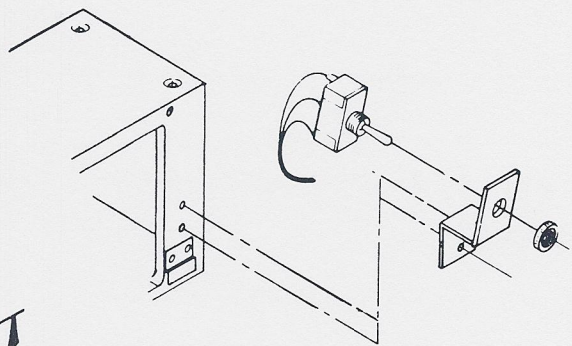
Right Hand Series AO Shown,
Left Hand Opposite



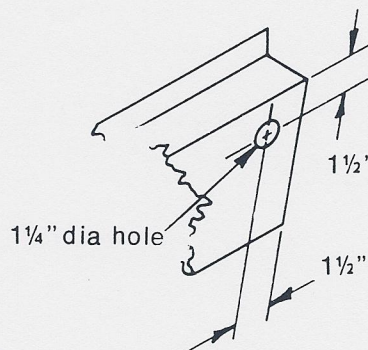
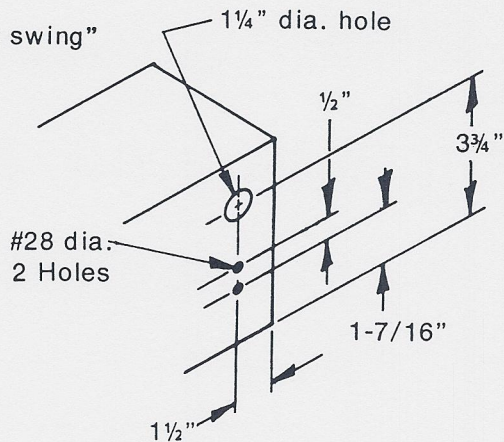
Mounting On-Off/Hold Open Switch

The header tubes are furnished prepared for mounting of the off-on/hold open switch for either side. The switch should always be accessible from the inside of the building only. The clearance hole in the cover for the switch must be drilled in the field.

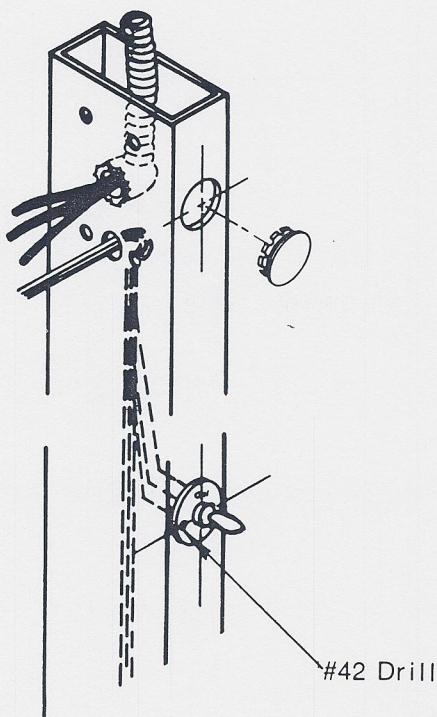
Tube prep for
for "in swing" AO Series



Tube prep for "out swing"
AO Series



This dimension may be 2"
when there is no finger guard.



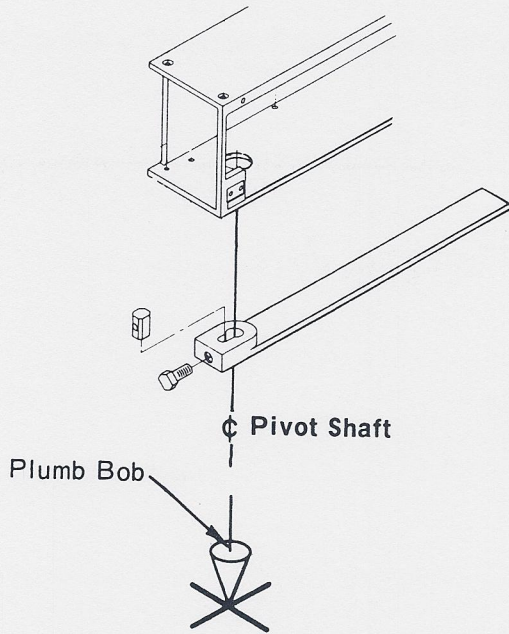
To mount the off-on/hold open switch in the side jamb, remove this switch from the control. Drop the switch down through the 1/2" diameter access hole and fish switch toggle out through the 1/2" diameter hole. Place the tabbed legend washer over the shank of the switch, and secure in place with the lock 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, feed the wires back through the 1/2" diameter access hole and into the header, reconnect to the control and power lead in.

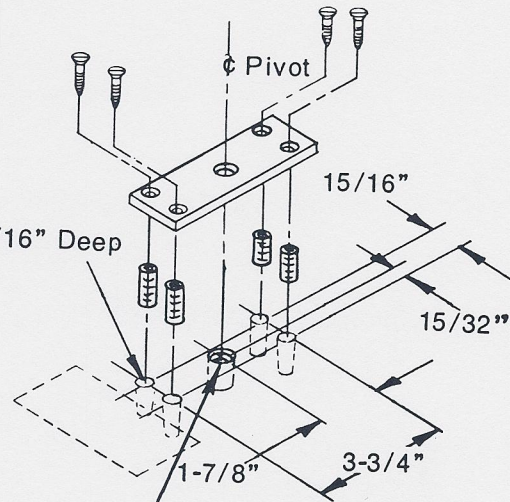
Bottom Pivot Preparation

Preparation for Bottom Pivot

Drop plumb bob from center line of pivot shaft on operator to floor. Mark floor. This is center of pivot for pivot plate. Locate and drill all holes into floor. Insert anchor bolts and attach plate to floor.



3/8" Drill 1-1/16" Deep
4 Holes



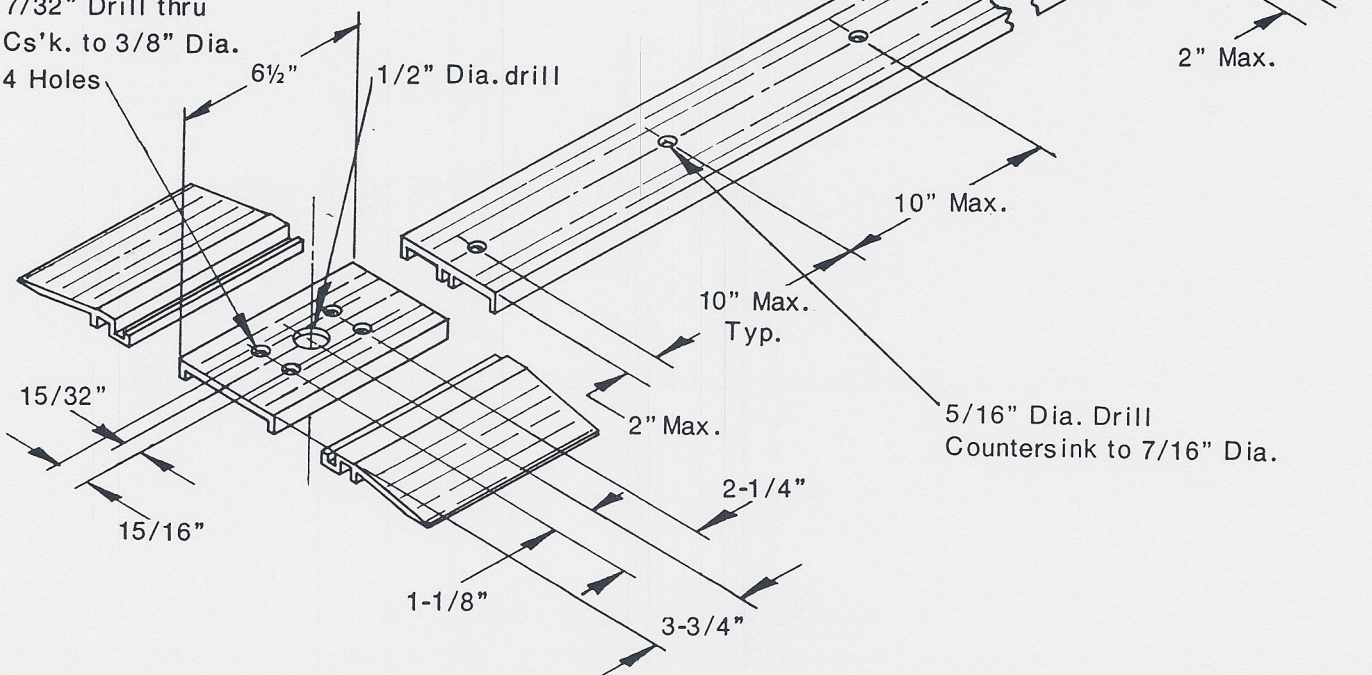
3/4" Dia. hole 3/4" Deep
Hole required when door rail
depth is less than 1-9/16"

Threshold Preparation

The threshold furnished in the mat trim kit is one piece 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 piece 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 surface mounted mats.

7/32" Drill thru
Cs'k. to 3/8" Dia.
4 Holes



Installation of Floor Control Mats

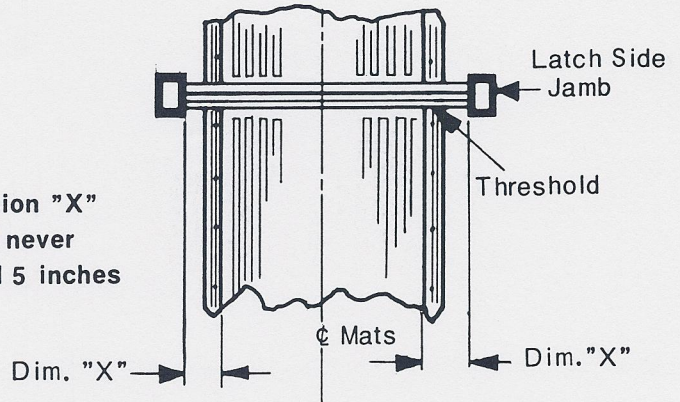
Position mats under threshold and center between jambs. **Caution: The distance from the edge of the "exposed" area of the mat to the jamb should never exceed 5 inches.**

With the mat lane 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" masonry bit and drill through the predrilled holes in the threshold.

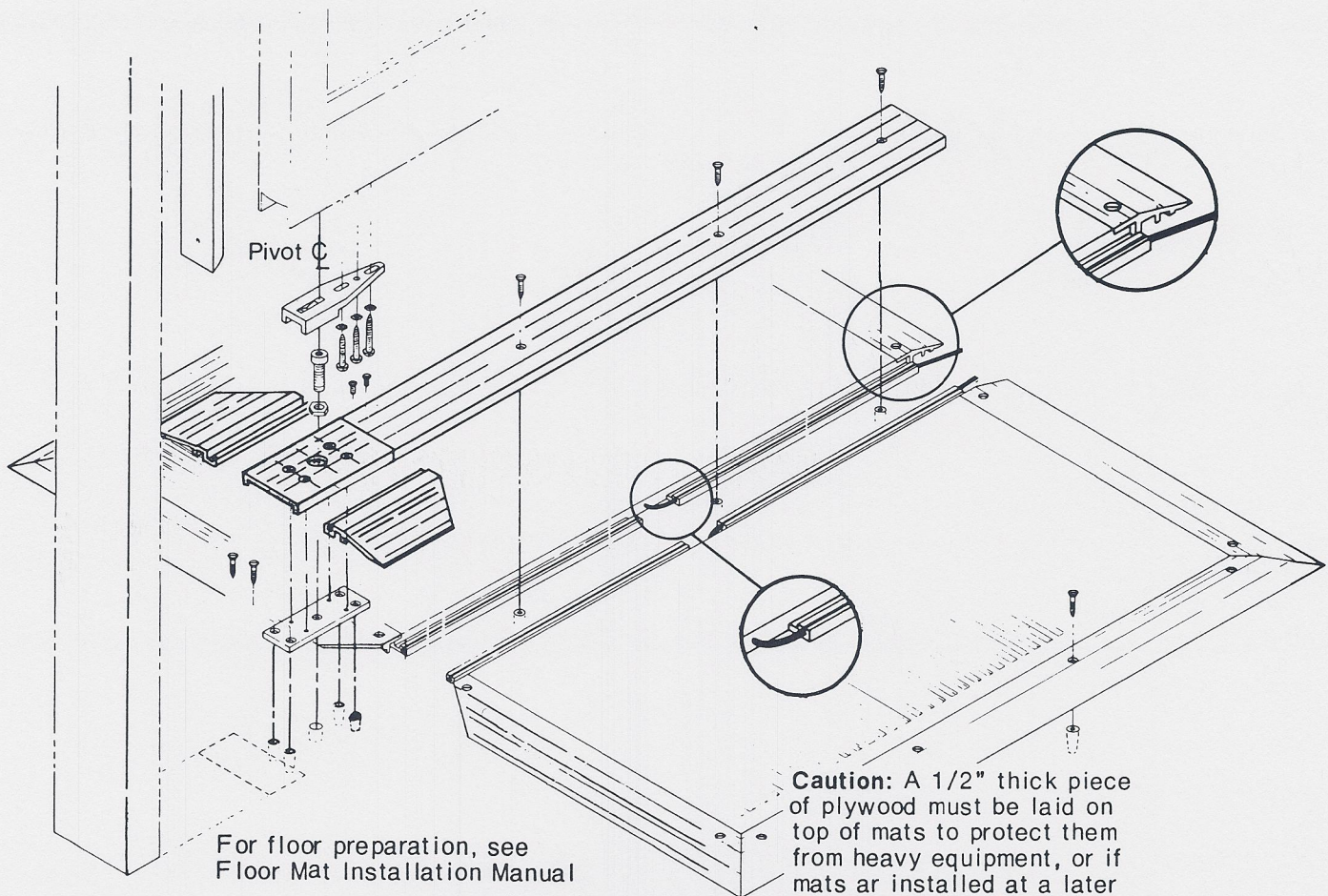


Caution: Place the mat lead wires into the wire groove on the end of the mats. Be sure the wires are out of the way before any drilling is performed. Be sure all dirt dust, shavings, etc. has been removed from under the mat trim and threshold before they are secured in place. Also be sure the mat lead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

Dimension "X" should never exceed 5 inches max.



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



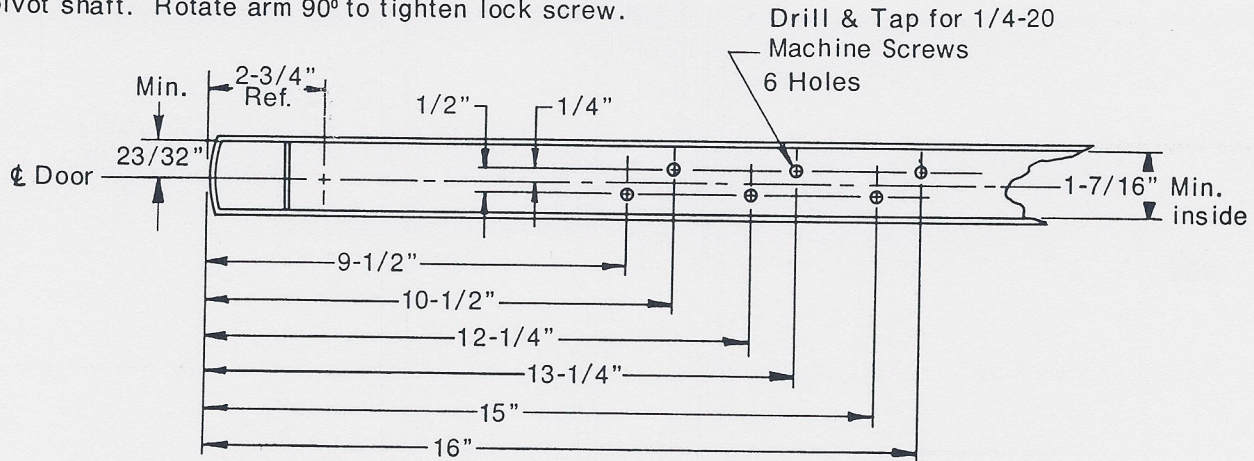
For floor preparation, see Floor Mat Installation Manual

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

Door Preparation

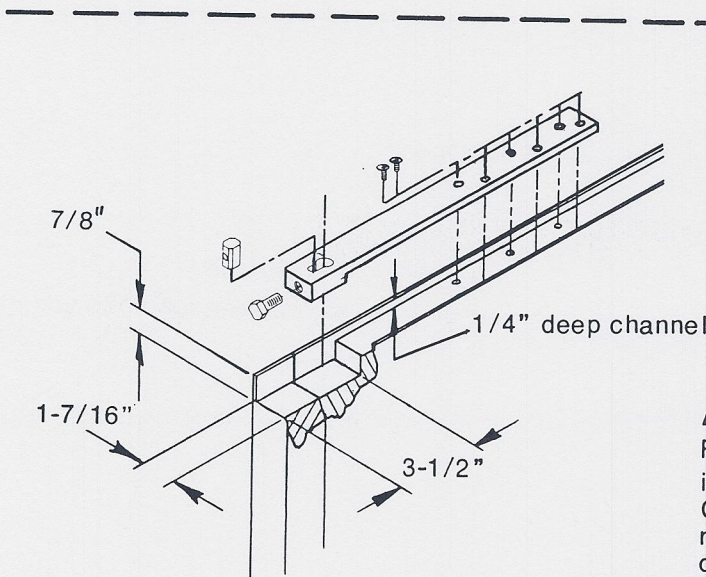
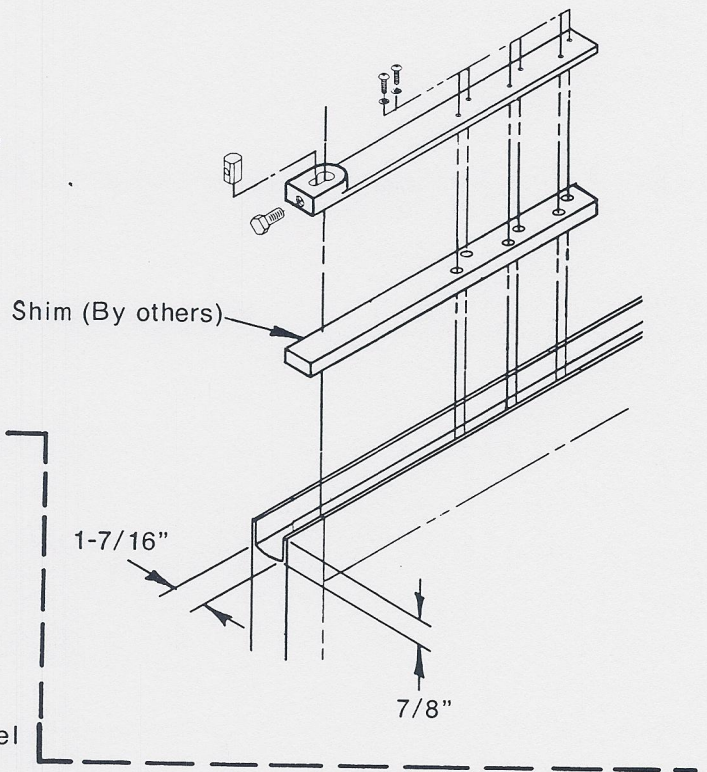
Preparation for Mounting Door Arm for Doors with 1" or 7/8" Deep Top Channel.

Drill and tap for 1/4-20 Machine Screw (6 Holes) as shown below. Cut 7/8" Deep x 1-7/16" wide relief slot in top of Hinge Stile. Mount door arm to operator pivot shaft. Rotate arm 90° to tighten lock screw.



Alternate for Channels Deeper than 1"

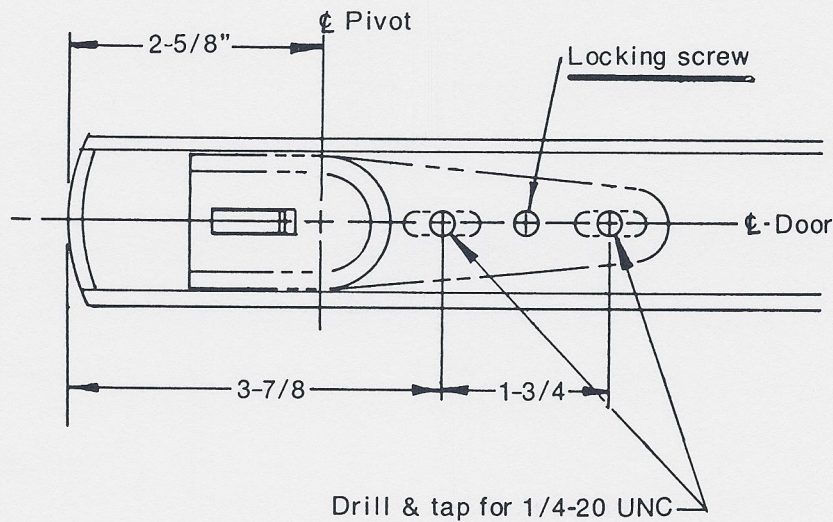
For door channels deeper than 1", add filler or shim to make depth of 7/8".



Alternate for 1/4" Deep Channel

For doors with 1/4" deep rib channel install door arm with boss down. Cut a 7/8" deep x 1-7/16" wide x 3-1/2" long relief slot into top rail for boss. Use same dimensions as above but holes are opposite as arm is turned over. Install onto operator pivot shaft. Use 1/4-20x1/2" long Flat Head Machine Screws to fasten door to arm.

Door Preparation

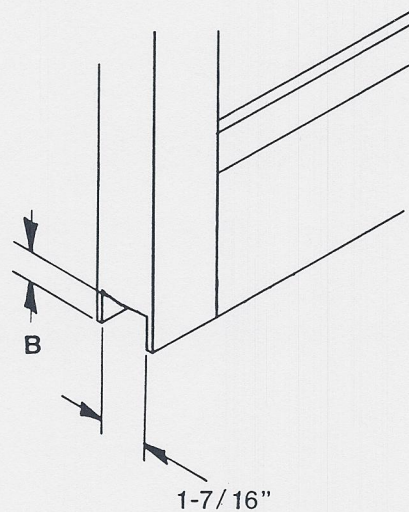


Preparation for Mounting Bottom Pivot

Locate and drill & tap 2 holes for 1/4-20x1/2" 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, 1-7/16" minimum.

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

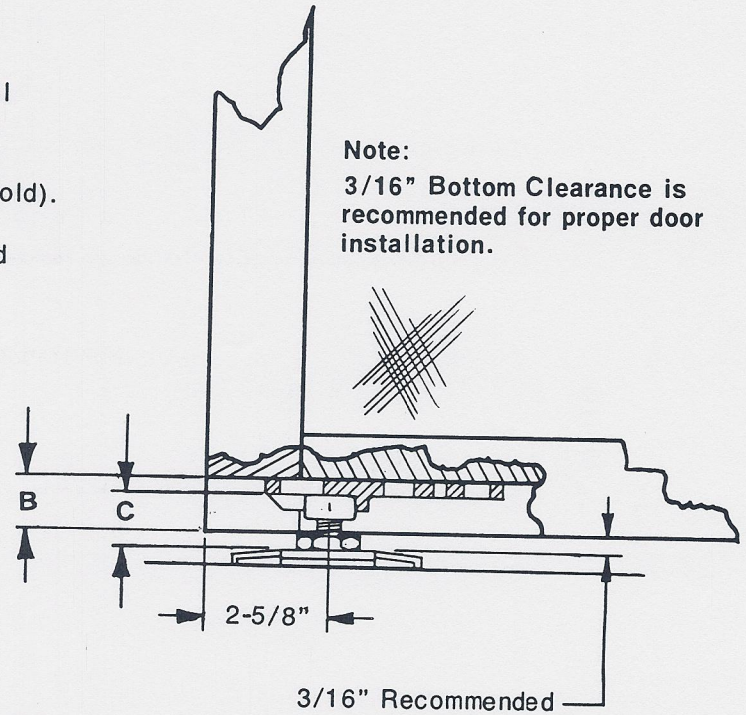
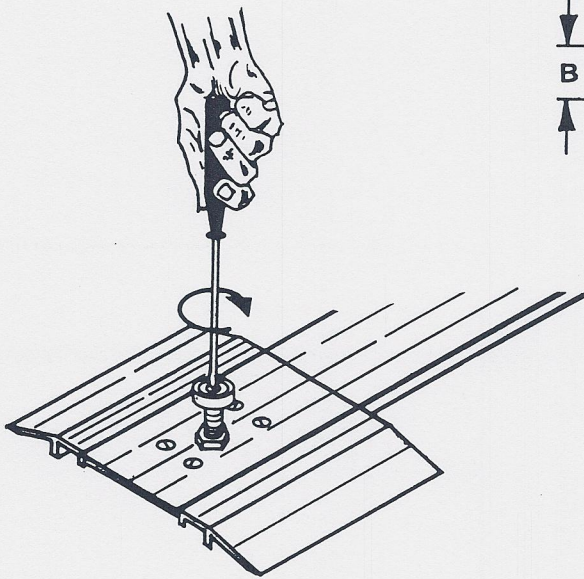
Do not drill and tap for the locking screw until after the door has been hung and final adjustments have been made. After final adjustments, drill and tap for 1/4-20 locking screw.



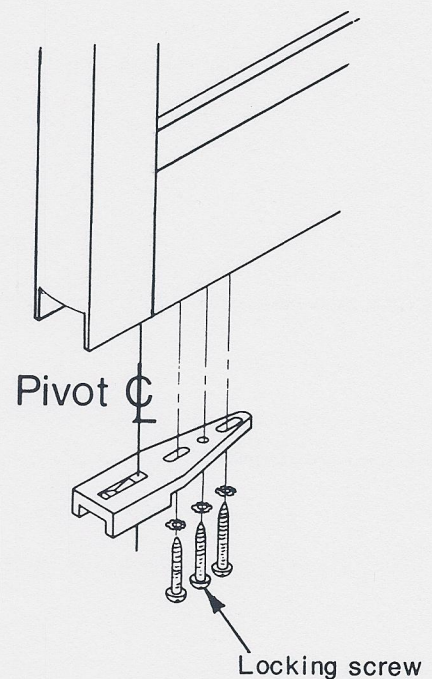
Door Installation

To Set Height of Bottom Pivot

1. Measure depth of bottom door channel. This will be dimension "B".
2. Subtract $1/16$ " from dimension "B". This will be dimension "C". Dimension "C" is the distance from the top of the **Pivot** to the top of the threshold (or finished floor if no threshold).
3. Turn **Bottom Pivot Shaft** up or down as needed to meet "C" dimension. (See Fig. A)
4. Lock **Bottom Pivot Shaft** with $3/4$ " locknut.



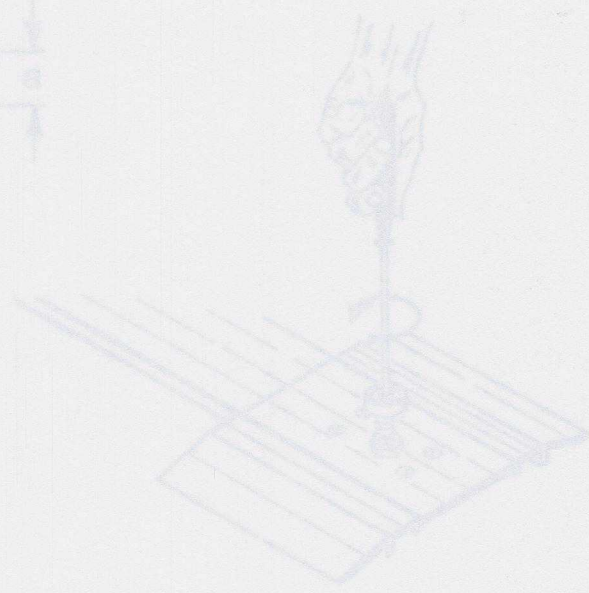
5. Mount bottom pivot bearing plate in bottom rail using (2) $1/4-20 \times 1/2$ " Phillips Round Head screws with lockwashers. Set centerline of bearing socket $2-5/8$ " from heel of door. Tighten screws enough to make final adjustment with door installed in position. Do not drill and tap for locking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



Door Installation

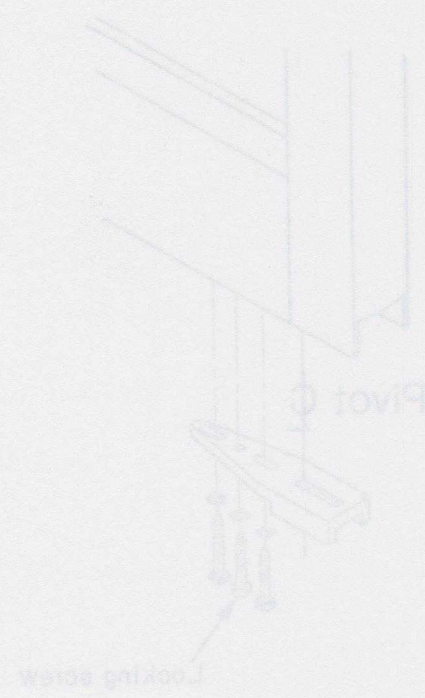
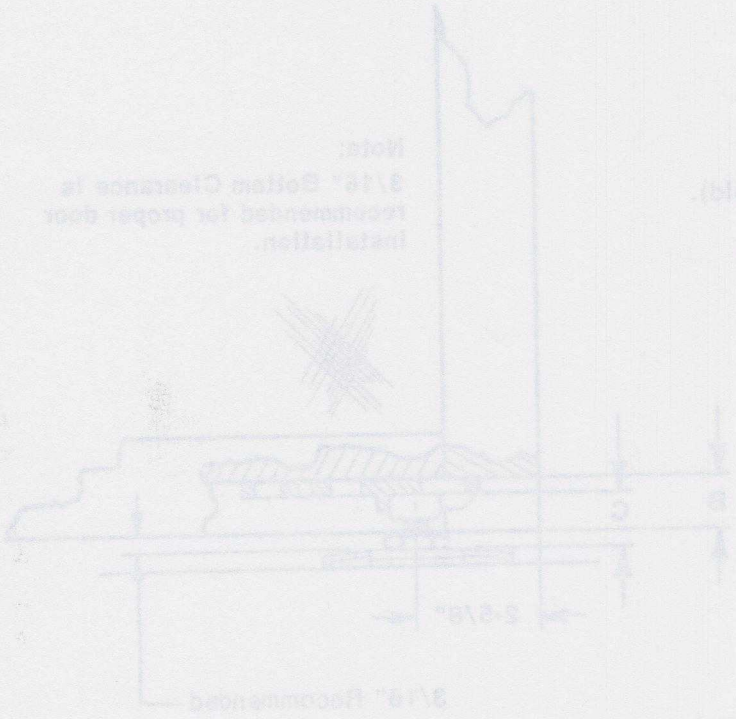
To Set Height of Bottom Pivot

1. Measure depth of bottom door channel. This will be dimension "B".
2. Subtract 1/16" from dimension "B". This will be dimension "C". Dimension "C" is the distance from the top of the pivot to the top of the threshold (or finished floor if no threshold).
3. Turn Bottom Pivot Shaft up or down as needed to meet "C" dimension. (See Fig. A)
4. Lock Bottom Pivot Shaft with 3/4" locknut.



5. Mount bottom pivot bearing plate in bottom rail using (2) 1/4-20 x 1/2" Phillips Round Head screws with lockwashers. Set centerline of bearing socket 2-5/8" from heel of door. 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.

Note:
3/16" Bottom Clearance is recommended for proper door installation.

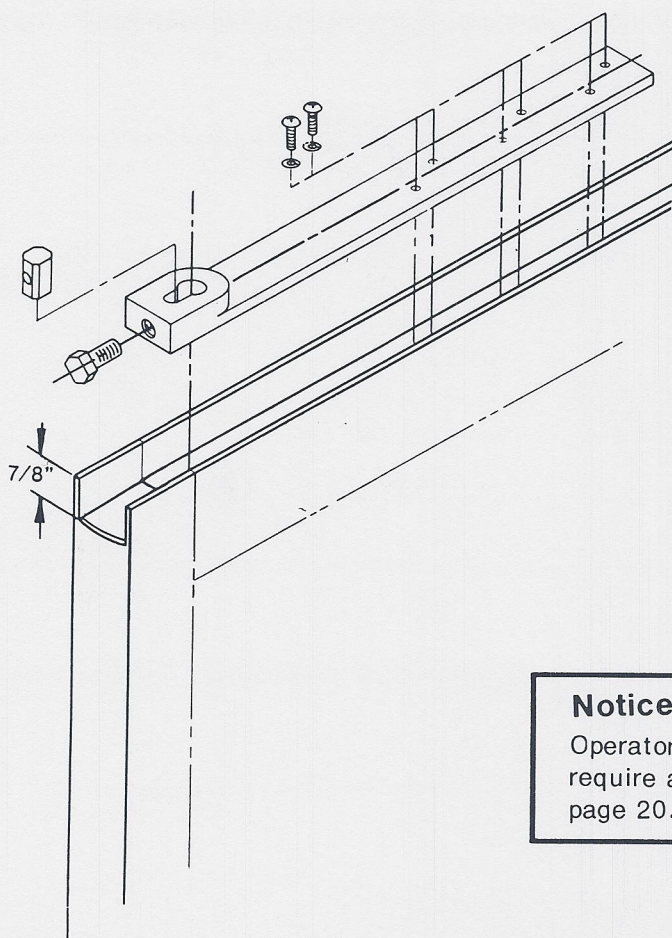
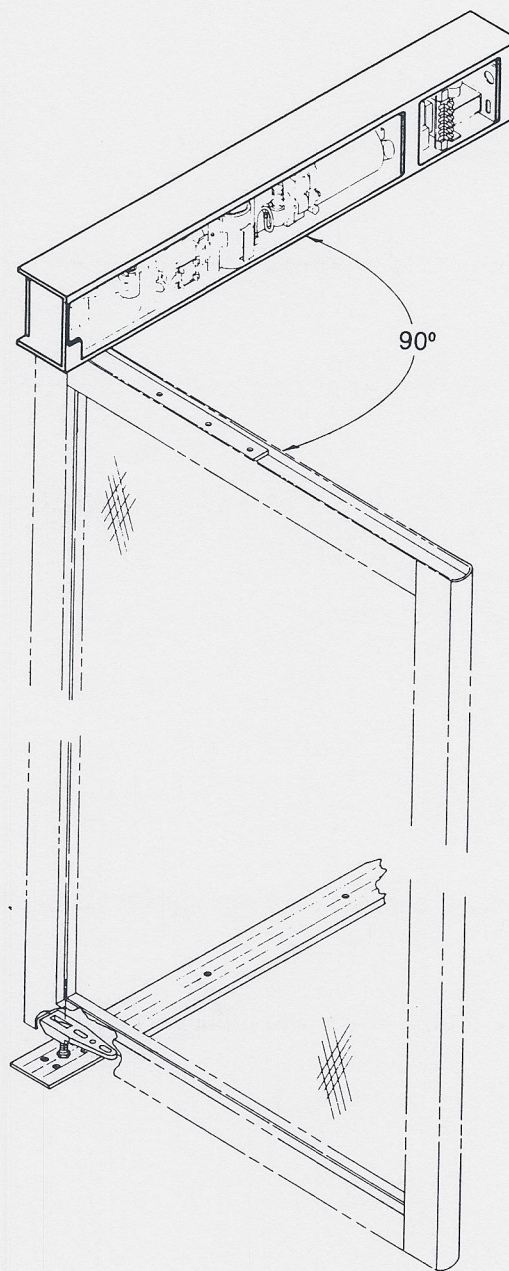


Door Installation

Mount door arm to operator pivot shaft.
Be sure drive key is centered in shaft
keyway and lock screw is engaged in
socket hole in back of the drive key.
Tighten lock screw to **65 foot pounds of torque**.

2. Switch operator to hold open to rotate door arm to 90°. If no power is present swing out the door arm manually to 90°. Turn **Sweep Valve** 'in', 2-3 turns to hold door open. See Page 19 for valve adjustment.
3. Adjust **Bottom Pivot** in threshold to carry weight of door. No door weight should be carried on top door arm.
4. Slide door into position. Temporarily attach door arm. Use 1/4-20x1" long Phillips Round Head Machine Screw to attach door to arm.
5. Open **Sweep Valve** on operator. Check door to be sure it swings freely and does not bind and is square in the frame.
6. Remove door. Drill and tap bottom of door for 1/4-20 screw to lock **Bottom Pivot Block** on door in position.

Reinstall door and set all screws
as final .



Notice:

Operators with regular arms (non-panic) require a door stop on the frame. See page 20.

Cover Installation

Matching covers will be furnished for both sides of the header. However, by special order it is possible to obtain a header tube free of all cut outs or screws on one side. In this case only one cover will be required.

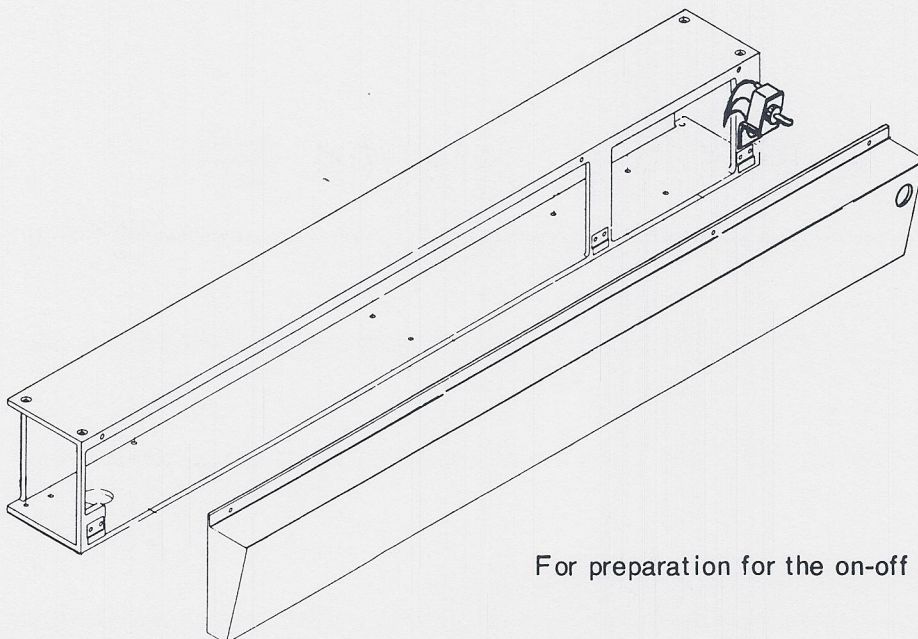
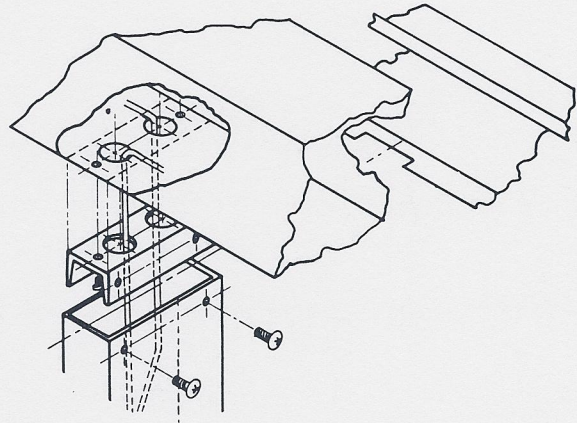
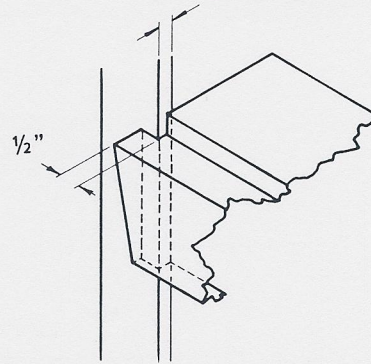
Covers are furnished to standard lengths and ends may need to be notched to clear side jambs if no finger guards are furnished or if the covers overlap the side jambs and side jambs are wider than the header tubes.

On dual units with center mullion, with the center mullion wider than the header tube the covers may need to be notched to clear the jamb.

Mounting Cover

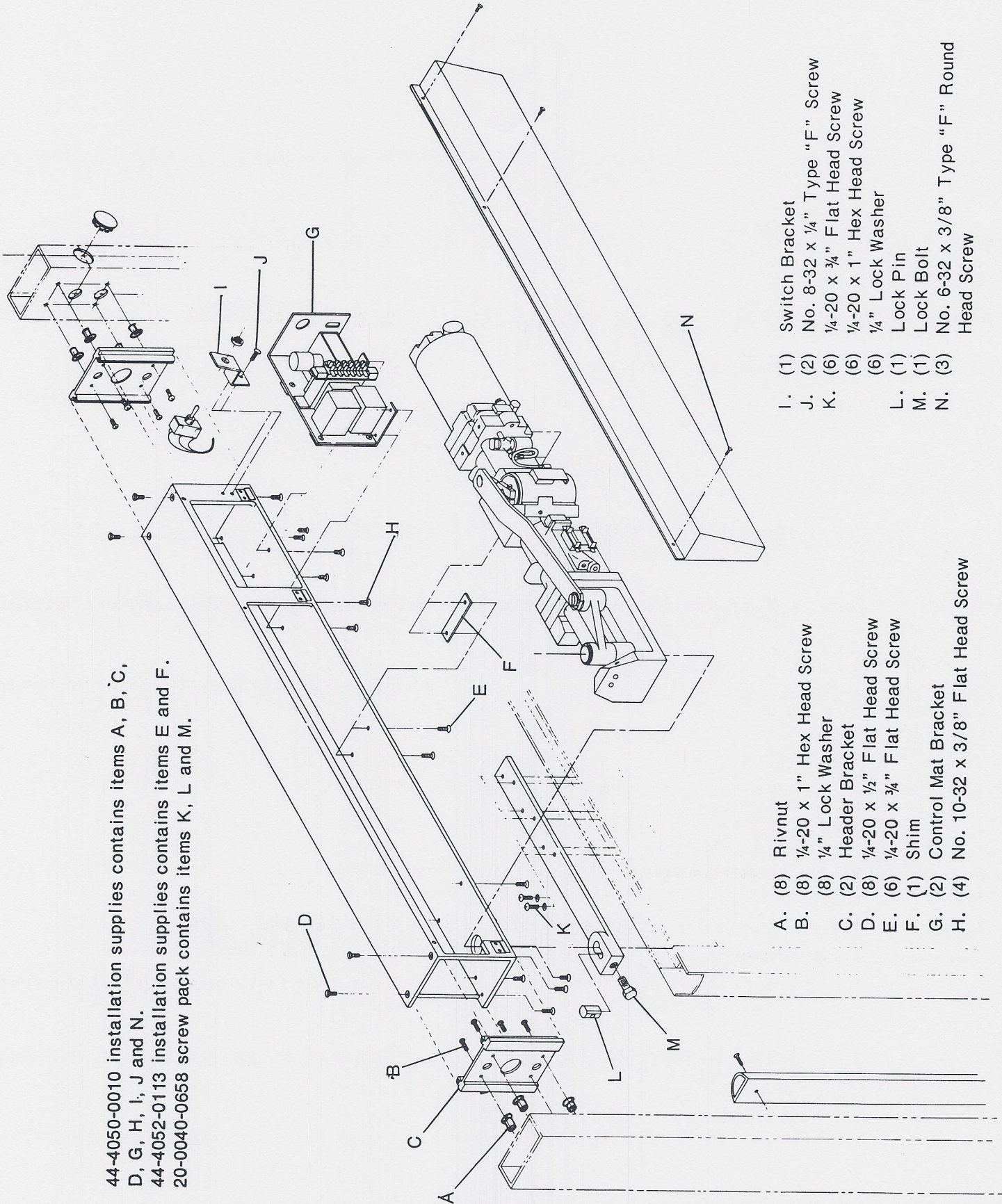
Insert bottom lip on cover under clips on operator tube. Position cover and fasten cover with self-tapping screws.

Varies with side jamb used



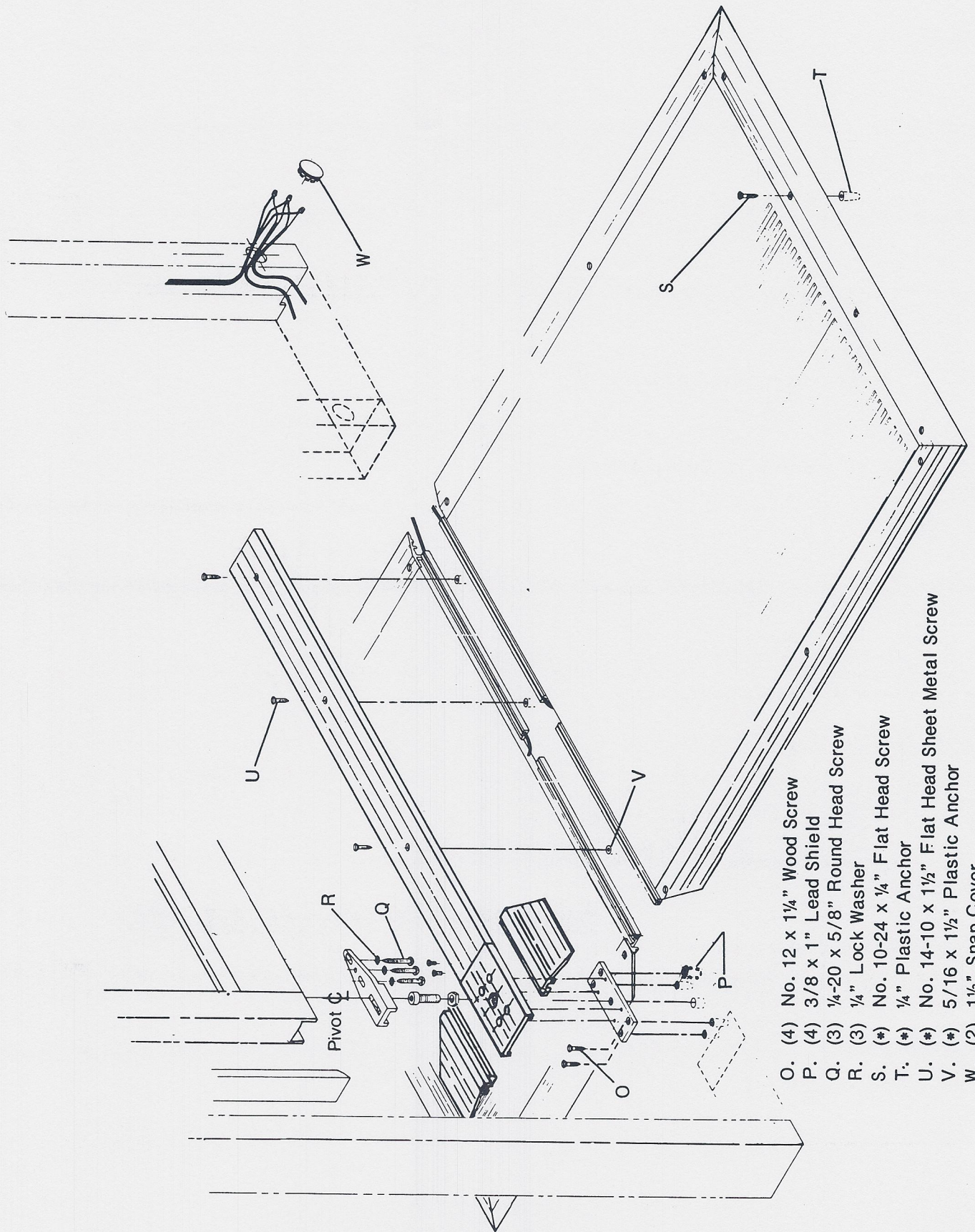
For preparation for the on-off hold open switch see page 5.

Exploded View of Complete Installation



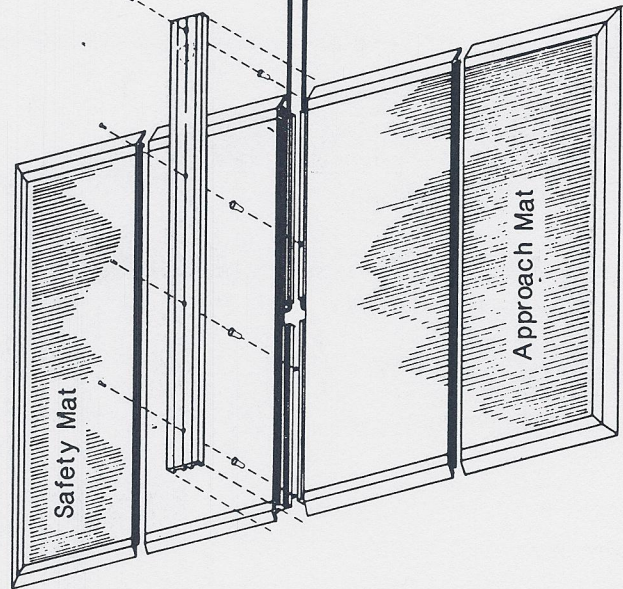
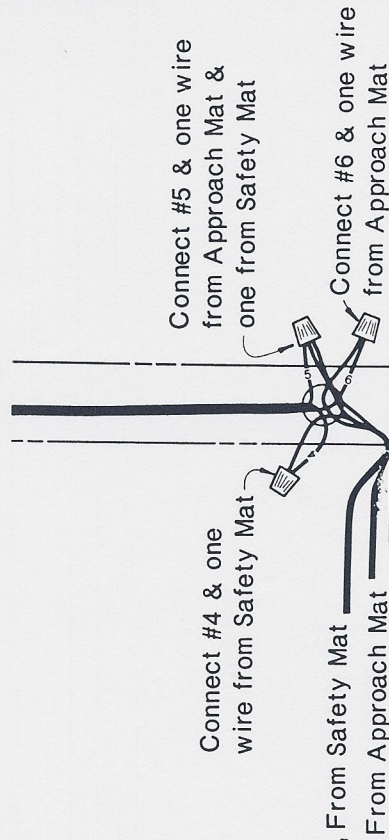
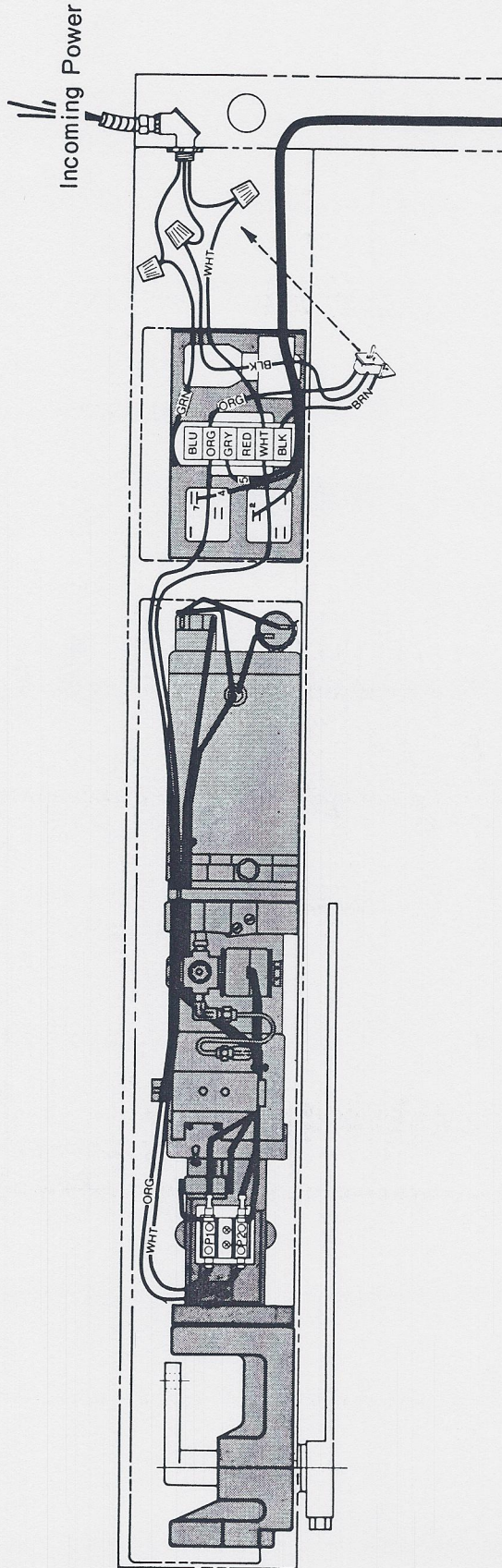
- I. Switch Bracket
- J. No. 8-32 x 1/4" Type "F" Screw
- K. 1/4-20 x 3/4" Flat Head Screw
- L. 1/4-20 x 1" Hex Head Screw
- M. Lock Pin
- N. No. 6-32 x 3/8" Type "F" Round Head Screw

- A. (8) Rivnut
- B. (8) 1/4-20 x 1" Hex Head Screw
- C. (8) 1/4" Lock Washer
- D. (2) Header Bracket
- E. (8) 1/4-20 x 1/2" Flat Head Screw
- F. (6) 1/4-20 x 3/4" Flat Head Screw
- G. (1) Shim
- H. (2) Control Mat Bracket
- I. (1) Switch Bracket
- J. (2) No. 8-32 x 1/4" Type "F" Screw
- K. (6) 1/4-20 x 3/4" Flat Head Screw
- L. (6) 1/4-20 x 1" Hex Head Screw
- M. (1) Lock Pin
- N. (3) No. 6-32 x 3/8" Type "F" Round Head Screw



- O. (4) No. 12 x 1 1/4" Wood Screw
 - P. (4) 3/8 x 1" Lead Shield
 - Q. (3) 1/4-20 x 5/8" Round Head Screw
 - R. (3) 1/4" Lock Washer
 - S. (*) No. 10-24 x 1/4" F Flat Head Screw
 - T. (*) 1/4" Plastic Anchor
 - U. (*) No. 14-10 x 1 1/2" F Flat Head Sheet Metal Screw
 - V. (*) 5/16 x 1 1/2" Plastic Anchor
 - W. (2) 1 1/2" Snap Cover
- * As Required

Field Wiring Instructions



Adjustment and Checkout Speed and Pressure

Important

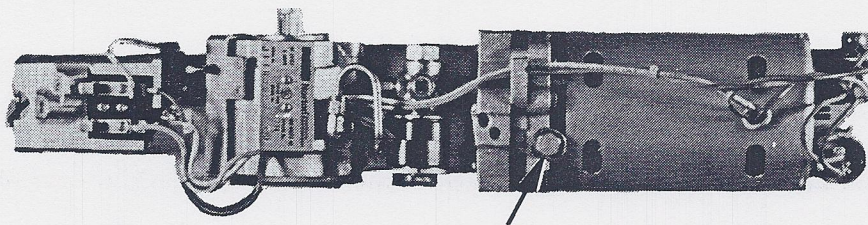
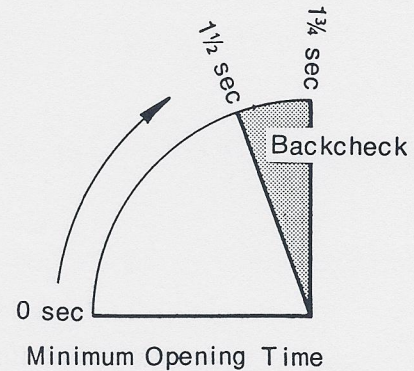
Test all operator functions using operation switching devices such as mats, photoelectric, wall switches, and on-off/hold open switch.

As the unit warms up to operating temperature, operating speeds will increase therefore the speed must be set slower than normally desired.

Timing of Door Swing (Opening)

The time of swing of an average size door*, from the moment of start until the door reaches backcheck position shall not be less than 1½ seconds. Full opening to 90° shall not be less than 1¾ seconds.

*Average size door is 36" to 42" and weighs 80lbs. to 150lbs.. Larger and heavier doors should be set to operate slower.



Adjustment

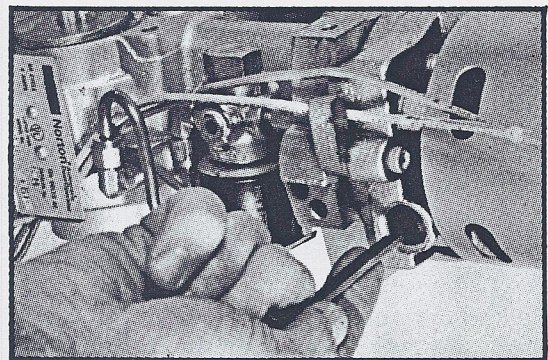
Speed Adjustment

To adjust opening speed, remove ½" hex head cap plug on the pump with a 6 sided box end wrench or socket. Do not use an open end wrench or 12 point wrench.

Using a 3/16" Allen wrench, turn Allen set screw (found under hex cap plug) clockwise to increase speed, counter clockwise to decrease speed.

After the proper speed has been obtained replace cap plug. Tighten, do not overtighten. Be sure that the cap plug does not bottom on the adjustment screw.

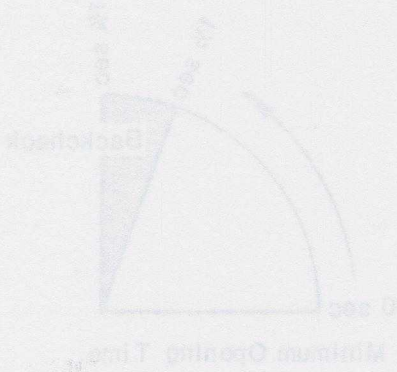
Caution: Before increasing the pressure to obtain the desired door speed, be sure the door is not dragging on the threshold, floor or mat or it is not binding on the pivots. Recheck these points.



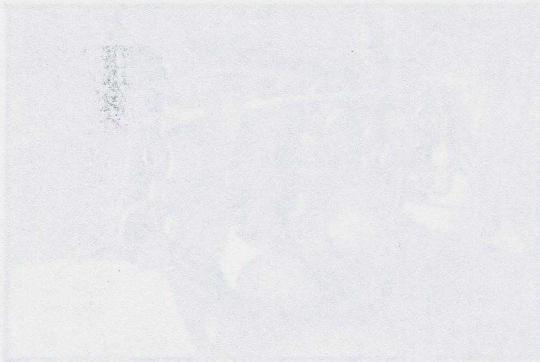
Caution: Do not overload motor. To check for overloading, block or hold the door in a half open position (approximately 45°). If the motor lopes, jerks, or growls, the speed is too fast. To correct this, reduce speed until the motor runs smoothly.

Adjustment and Checkout Speed and Pressure

As the unit warms up to operating temperature, operating speeds will increase. Therefore, the speed must be set slower than normally desired.



Caution: Before increasing the pressure to obtain the desired door speed, be sure the door is not dragging on the threshold, floor or mat or is not binding on the pivots. Backlash points.



Caution: Do not overload motor. To check for overloading, block or hold the door in a full open position (approximately 45°). If the motor lopes, jerks or grows, the speed is too fast. To correct this, reduce speed until the motor runs smoothly.

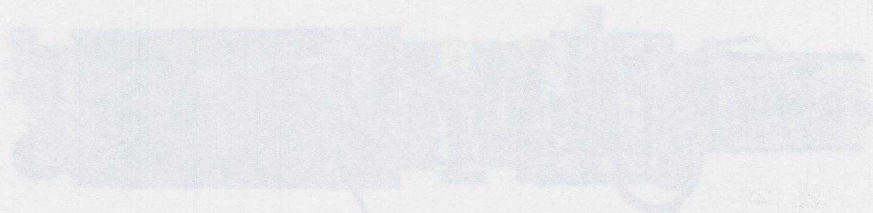
Important

Test all operator functions using operation switching devices such as male, photoelectric wall switches, and on-off/hold open switch.

Timing of Door Swing (Opening)

The time of swing of an average size door, from the moment of start until the door reaches backcheck position shall not be less than 1 1/2 seconds. Full opening to 90° shall not be less than 1 1/2 seconds.

*Average size door is 36" to 42" and weighs 80 lbs. to 120 lbs. Larger and heavier doors should be set to operate slower.



Adjustment Speed Adjustment

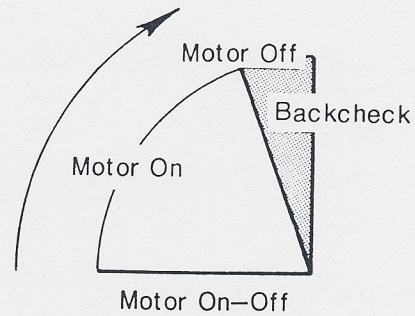
To adjust opening speed, remove 1/2" hex head cap plug on the pump with a 5 sided hex end wrench or socket. Do not use an open end wrench or 12 point wrench. Using a 3/16" Allen wrench, turn Allen set screw (found under hex cap plug) clockwise to increase speed, counter clockwise to decrease speed.

After the proper speed has been obtained replace cap plug. Tighten, do not over-tighten. Be sure that the cap plug does not bottom on the adjustment screw.

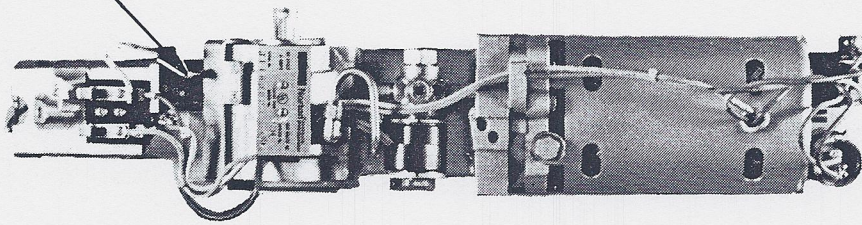
Adjustment and Checkout Limit Switch

Function of Limit Switch

The operation of the motor is to open the door, **Not to hold it open**. The limit switch is to shut off the motor after opening the door into the backcheck position. The actual point of shut off will vary depending on the weight of the door and the degree of backcheck. The heavier the door or the greater the speed, the sooner the motor must be shut off. The door should stop smoothly at 90° of opening.



Limit Switch
Adjustment Screw

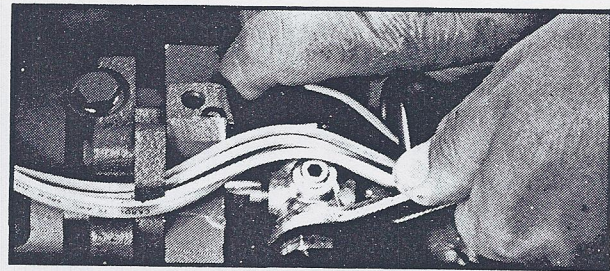


Adjustment

To adjust: Turn the adjustment screw on the limit switch counterclockwise to decrease motor run. To increase the motor run turn it clockwise. It may be necessary to adjust the backcheck when adjusting the limit switch.

Note: Cam follower and limit switch must have free movement before accurate adjustment can be attained.

Caution: With an improper adjustment of the limit switch and an overrun of the motor, the piston of the operator may travel to the end of the cylinder and bottom. This may cause too much pressure against the solenoid valve. Should the door not close, the solenoid valve is locked. **Caution: Do not force the door closed.** Should the solenoid lock, support the body of the solenoid valve and turn the $\frac{3}{4}$ " brass cap nut counterclockwise not more than $1\frac{1}{2}$ turns. This will permit the pressure in the valve to drop sufficiently to let the door close. Retighten cap nut.



After the door is closed, readjust the limit switch turning the screw counterclockwise to cut off the motor sooner. Also the opening speed must be reduced by turning the speed adjustment screw counterclockwise to slow the opening speed .

Adjustment and Checkout Backcheck

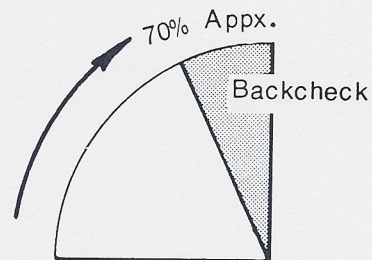
General Information

The Norton operator has a dual backcheck system; backcheck valve ('BC') regulates the cushioning of the door to a smooth stop at 90° opening, and positioning valve ('P') provides two starting positions of backcheck.

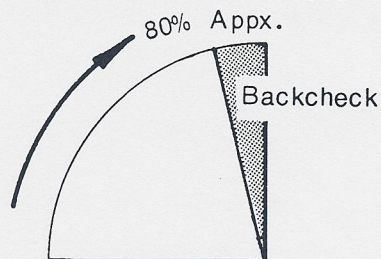
Valve 'BC' is the backcheck cushioning valve. Turning the valve in (clockwise) increases backcheck. Turning the valve out (counterclockwise) decreases backcheck.

Valve 'P' is a two position valve. With valve 'P' turned all the way in (closed) the backcheck range will start at approximately 70° of door opening. With valve 'P' turned out (open) backcheck range will not start until approximately 80° of door opening.

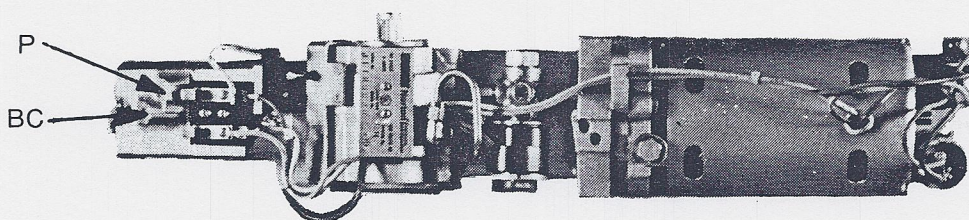
Do Not Force the adjustment valves beyond a seated position. To open 'P' valve, turn adjustment screw counterclockwise until the head is just flush with the surface of the body.



Position 'P' Valve Closed



Position 'P' Valve Open



Adjustment

In the opening cycle, if the door seems to labor as it reaches the start of backcheck, turn the 'BC' adjustment screw 1/8 turn counterclockwise to decrease the backcheck. Repeat the procedure until a smooth operation is attained.

If the door opens too fast and 'bounces' when it reaches the full 90° open position, increase the backcheck by turning the 'BC' adjustment screw clockwise.

Note: It may be necessary to reset the limit switch after making the backcheck adjustments.

Heavier and larger doors require greater backcheck and the limit switch must be set so the motor will shut off sooner.

Adjustment and Checkout Sweep and Latch

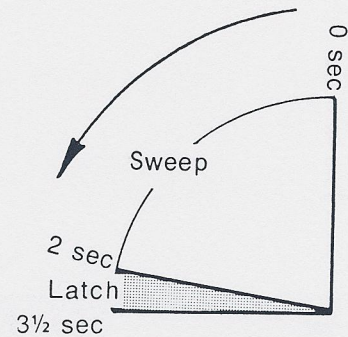
Door Closing Control

The closing speed of the door is controlled by the **Sweep Valve** which controls the major portion of the closing and the **Latch Valve** which controls the final portion to latching of the door.

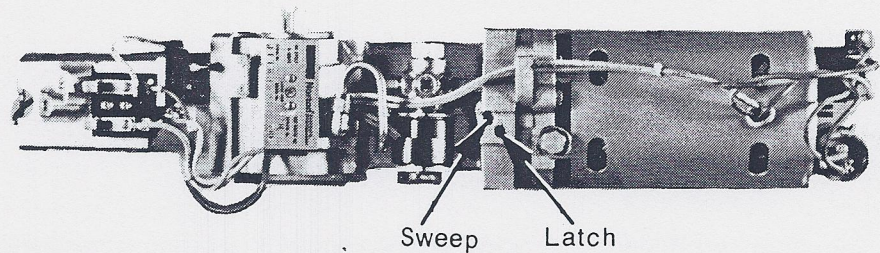
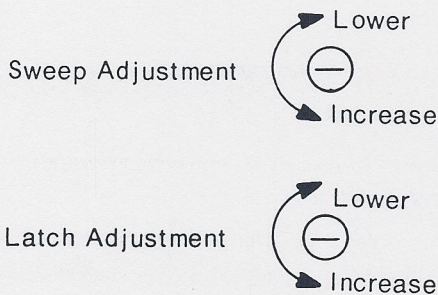
Timing of Door Swing (Closing)

Time required for the sweep speed shall **not** be **less** than 2 seconds and the latch speed (last 12" of door travel) shall **not** be **less** than 1½ seconds.

When you make adjustments to one, you may find it necessary to adjust the other.



Minimum Closing Time



Adjustment

To adjust either the sweep or latch speed, turn the adjustment screw clockwise to lower the speed and counter-clockwise to increase the speed. Move the valve 1/8 to 1/4 of a turn at a time. Recheck door operation after each adjustment. Set adjustments so door comes to a smooth stop without bouncing.

Note: The **Latch** adjustment valve is the valve closest to the motor.

Top Pivot

The Norton overhead concealed model CO8 automatic operator is available with two styles of top pivot assemblies. The **Regular Arm** which is non-panic and the **Emergency Arm** which has a panic breakaway feature.

Regular Arm

The **Regular Arm** is intended for doors with outward swing or locations where emergency breakaway is not required. This type of door pivot assembly is set up to provide a preload. In other words, as the door closes, it would swing past center, and thus requires an external stop on the header or frame to hold the door in the centered position. This preload insures a steady pressure of the door against the stop to keep it from rattling by the buffering of the wind and to hold it in a firm position for locking. **Please note: Because of the various types of doors and frames with which the Norton overhead concealed unit can be used, the external door stop must be made by others.**

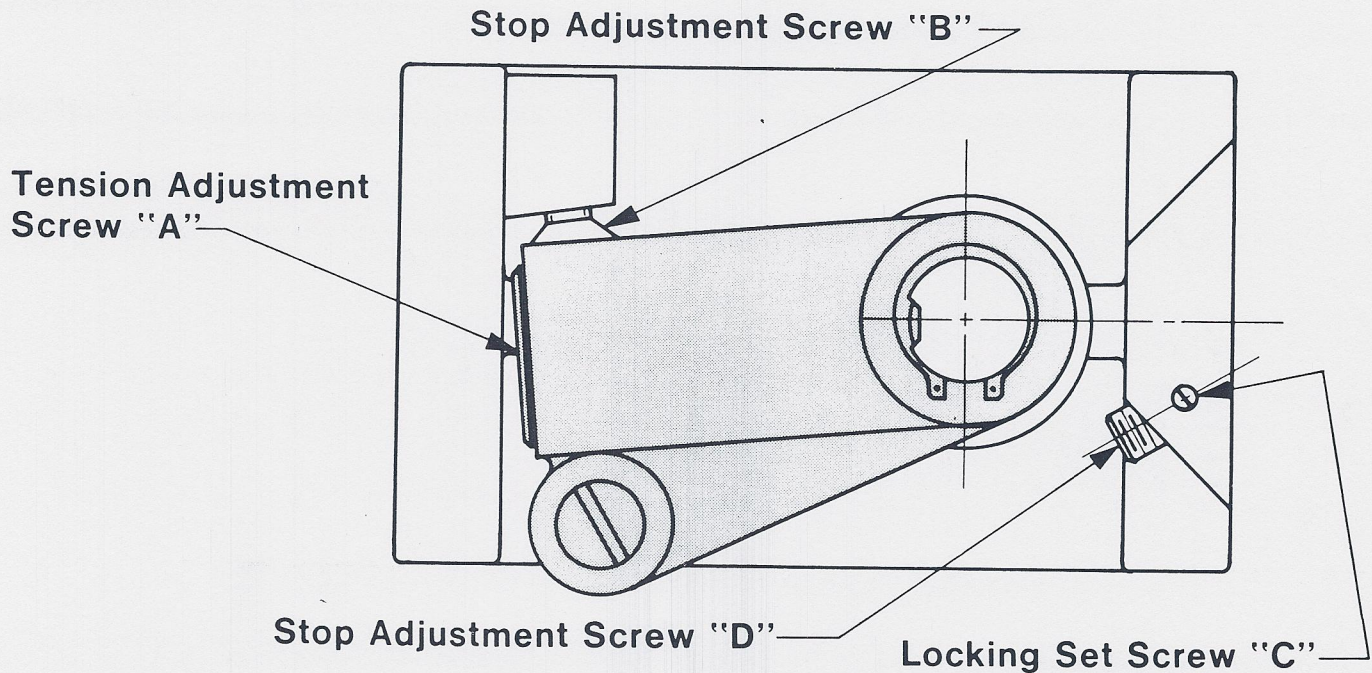
Panic Breakaway Adjustment

Panic Breakaway Pivot Assembly

On door assemblies equipped with the emergency or panic breakaway assembly, the door must be installed free of all external stops. The stop is made a portion of the pivot assembly. See Figure.

The stop is set by the factory prior to shipment. However, after the door arm has been mounted to the top of the door, should you find the door is not perfectly centered in the closed position, the stop may be adjusted. For the AO series operators, use adjustment screw "B". If the door does not close all the way, turn the stop screw "in" clockwise. If it closes too far, then back "out" counterclockwise.

For the AR series operators, use stop adjustment screw "D". Stop screw "D" is equipped with a locking set screw "C". Loosen this screw, before making adjustments, and retighten after adjustments have been completed. Again, for adjustments for the door to close further, turn adjustment screw "in" for the door to stop sooner, back "out" the screw.



Panic Breakaway Tension Adjustment

The tension adjustment for the panic breakaway is set before shipment. However, there are variances in the codes as to breakaway tension requirements. To check breakaway, attach a spring scale to the lock style of the door and pull or push, observing the point of breakaway. Should you find it necessary to make a change in the tension, this can be done by turning in or out on adjustment screw "A". To increase, turn "in", to decrease, "out".

The following is a list of some of the local code requirements

Underwriters Laboratory	50 lbs. max.
State of California	40 lbs. max.
New York State	20 lbs. max.
Pennsylvania State	50 lbs. max.
NFPA-101	50 lbs. max.
New York City	15 lbs. max.
BHMA	50 lbs. max.

Wiring Diagram

April 15, 1975 WD-1B

